COMMERCIAL FISHERIES REVIEW

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United States Department of the Interior
Washington, D.C.

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FRED A. SEATON, SECRETARY

FISH AND WILDLIFE SERVICE
JOHN L. FARLEY, DIRECTOR

COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BRANCH OF COMMERCIAL FISHERIES

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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, August 2, 1955. (8/31/57)

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CORRECTION: April 1956 issue: The Japanese fishing vessels reproduced on the front cover page and on page 34, labeled Kuroshio No. 21, are labeled incorrectly. The photograph on the cover page is the Bocho Maru No. 1 and that on page 34 is the Shirogami Maru No. 1, according to advice received from Japan.

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COMPOSITION OF SOUTHERN OYSTERS

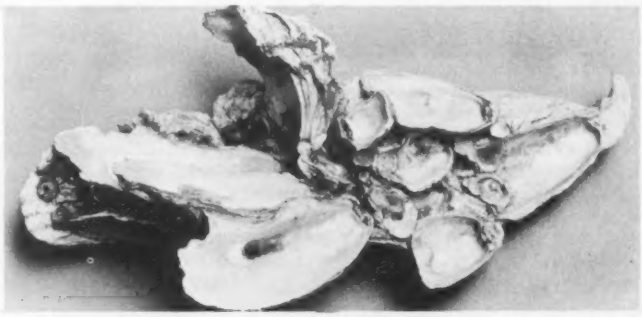
By Charles F. Lee* and Leonard Pepper**

ABSTRACT

Southern oysters collected from plants along the South Atlantic and Gulf Coasts have been analyzed for dry matter, protein, fat, mineral matter, and salt. The carbohydrate content was calculated by difference. During the period from October 1954 to October 1955 inclusive, 58 sample pairs were collected, each consisting of a sample of oysters taken at the plant directly from the shell oysters, and a sample of the regularly shucked and washed commercial product from the same lot of oysters. It was found that the dry matter, fat, and carbohydrate content of the "shell" samples all changed in a similar manner during the season. Minimum values for monthly averages were observed for September and October and maximum values for April or May. This had been expected because of the relationship of these constituents to the spawning cycle; however, no explanation is apparent for a very similar fluctuation in the mineral matter and salt content of these oysters. Comparisons of all data have been made on a dry-weight basis. When the data for "plant" and "shell" samples were averaged by states, the values for constituents of the "plant" were slightly greater than for the "shell" samples. Comparatively little difference between oysters from different states is evident from these averages. The large variability resulting from seasonal fluctuation masks the relatively minor effects of factors such as differences in plant practices and location. This study of composition of the Southern oyster is being continued for a second year.

BACKGROUND

Technological investigation and research on the Southern oyster was started in October 1954 with funds provided by Public Law 466 (Saltonstall-Kennedy Act of 1954). It was thought desirable to conduct most of the research through contracts with qualified and interested groups in the area, because of the geographical remoteness of the Fish and Wildlife Service's nearest technological laboratory from the Gulf Coast and because of the highly perishable nature of the product. Staff members of the Service's Fishery Technological Laboratory at College Park, Md., were assigned to do the proximate analyses of oysters and keep close liaison with the contractors. Contracts were negotiated with three Southern universities during February 1955. Staff workers of the College Park Laboratory maintained liaison among the several groups, sponsored joint project conferences, and assisted in any way possible to facilitate research.



A cluster of South Atlantic oysters.

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FACTORS AFFECTING STORAGE OF RAW SHUCKED OYSTERS

Dr. E. A. Fieger and staff at Louisiana State University in Baton Rouge, La., contracted to investigate factors affecting frozen storage of raw shucked oysters. The first year in storage has been completed for the first lot of oysters; these were packed in May 1955. The results of this storage test will be reported shortly.

Since January 1956, when Southern oysters in good condition were available again, four new packs of oysters for frozen storage have been prepared: two from Louisiana, one from Bon Secour, Ala., and one from Mississippi. Storage tests should demonstrate whether factors related to the season of catch, location of beds, and methods of handling in the plant affect the quality of the frozen pack.

Dr. Fieger and his staff have also studied changes during iced storage of two lots of fresh oysters as commercially shucked and washed. The data from these tests should show, to some extent, the effect on quality and storage life, when iced, of oysters produced by the different methods of shucking and washing used by the various plants in this area.

DEVELOPMENT OF NEW COOKED SOUTHERN OYSTER PRODUCTS

A second contract was allotted to Florida State University in Tallahassee, Fla. Dr. Betty M. Watts and her staff of the School of Home Economics are primarily concerned with the development of new cooked Southern oyster products for frozen storage, such as stews, soups, scalloped oysters, and other casserole-type dishes in which the juices contribute flavor and nutritional value. Frozen products of this type involve a great deal of developmental research, and the problem has been complicated by the short season (January to April) during which good commercial oysters are available locally. However, encouraging progress has been made and it is expected that this program will be expanded considerably during the coming season.

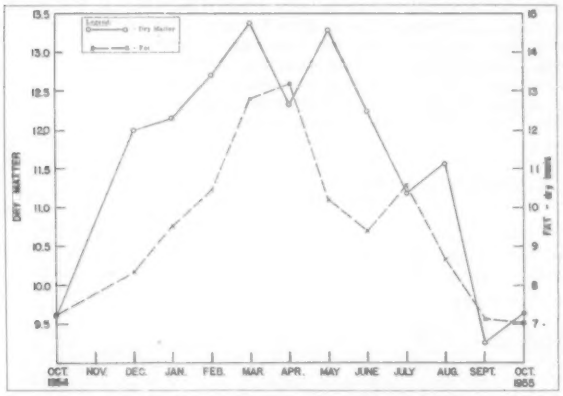

Fig. 1 - Average dry matter and fat content, dry-weight basis, of "shell" oysters according to month samples were collected.

Four separate reports on results of the work during the first contract year will be published by the group at Florida State University. The first on changes during storage of cooked oysters has been been submitted to Food Technology, and the second, on the relation of pH to quality of shucked oysters will be published in Commercial Fisheries Review. Reports are also in preparation on seasonal changes in total solids, niacin, and riboflavin content of the local oysters, and on the results of irradiation of oysters with Cobalt 60.

BODY-FLUID BALANCE AND DISCOLORATION IN SOUTHERN OYSTERS

Dr. Milton Fingerman at Tulane University in New Orleans has the third contract for some basic physiological research concerned with the body-fluid balance in live Southern oysters.

The results of Dr. Fingerman's initial research have been published in Tulane Studies in Zoology, vol. 3, no. 9, April 12, 1956. This research is continuing,

and will include during the second year a more extensive study of the internal sources of these fluids and the body mechanism that regulates their composition. Also under investigation are the causes of the brown or blackish discoloration that is observed in oysters from certain production areas. This discoloration has been the subject, in the past, of much speculation as to origin but little investigation, and the present work has mainly proven that most of the previously advanced explanations have little basis in fact. A preliminary report of this phase of their research will appear in Commercial Fisheries Review.

SEASONAL VARIABILITY IN COMPOSITION OF OYSTERS

Providing data on seasonal variability in compostion of the oysters from the numerous producing areas in the South is a second function of the Service's College Park Fishery Technological Laboratory. Contractors have, for the most part, used local oysters for their storage tests and other phases of their research. Knowledge of the effect of seasonal and geographical factors on the composition of the Southern oyster is needed to extend the applicability of the results of these research projects, since virtually no information on this subject is available in the literature. Samples collected throughout the area have been analyzed for dry matter, crude protein, fat, mineral matter, and salt. The carbohydrate content has been calculated by difference. All of these constituents vary markedly and the data serve adequately to demonstrate seasonal differences and variations due to location.

COLLECTION OF SAMPLES: The method of sampling raw shucked oysters is of importance because of the very rapid loss in body fluids and the resul+ing change in composition that occurs within minutes after shucking (Fingerman 1956). For the desired comparisons of season and area, plant samples were of little value since there were also large salt and fluid losses in the shucking bucket and in washing the shucked meats. Thus, for these comparisons, it was necessary to obtain samples shucked directly from the shell into a sample can at the plant by one of the regular oyster shuckers. These samples were difficult to obtain because shucking operations are irregular everywhere on the South Atlantic and Gulf Coasts except in New Orleans, being limited to 3- or 4-hour periods once or twice each week during much of the season.

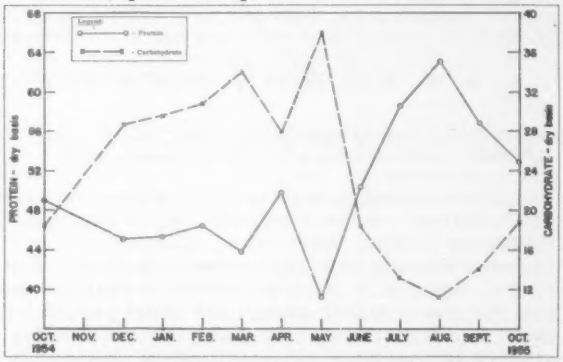

Fig. 2 - Average protein and carbohydrate content, dry-weight basis, of "shell" oysters according to month samples were collected.

Whenever a "shell" sample could be obtained, a comparable "plant" sample was also collected from the same lot of oysters that had been shucked in the usual manner, and drained and washed on the skimmer according to the usual plant practice. This permitted a comparison of the commercial product from various plants and, more specifically, a comparison of the effect of the different handling methods on the composition of the washed product. Because of the large differences in dry-matter content of these samples, the data have been converted to a dry basis for better comparison.

ANALYSIS OF DATA: The data for all constituents of the "shell" samples have been averaged by months to determine the extent of seasonal effect on composition (figs. 1, 2, and 3), and the same data for both "shell" and "plant" samples have been averaged for each state (table 1) to determine whether differences exist between oysters from the several states.

The data for the "shell" samples according to month of collection are summarized in figures 1, 2, and 3. Because of the difficulty in obtaining the "shell" samples, none of the monthly averages includes data for all six states that would be desirable for maximum significance. This results in a considerable range in the number of values for each month; from 11 for October 1954 to only 2 for the months from May through August 1955, when shucking has stopped in most areas. The summer samples were all collected from New Orleans plants by the staff of Louisiana State University.

The first samples were obtained in October 1954, and the figures include the period through October 1955 with data for all months except for November 1954. The change in composition, usually associated with the advancing season (the "R" months), is an improvement in the condition of the oyster after the summer spawning period. In the South the spawning period is much longer than in colder climates, and oysters are thin and in poor condition for a somewhat longer period, extending well into the fall months. The data in figures 1 and 2 show the very definite increase in dry matter, fat, and carbohydrates that occurred from October to March. Oysters were in good condition from March through May when judged on the basis of dry matter and carbohydrates, although the fat content had already decreased markedly by May. All three constituents were found in decreasing quantities during the summer, with the lowest values for each in September. Dry matter and fat had not changed in October but the carbohydrate content had increased slightly.

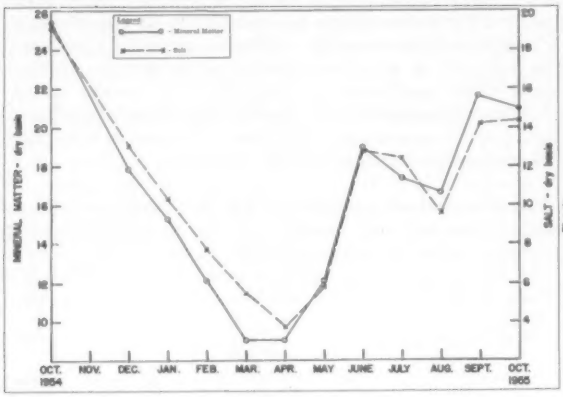

Fig. 3 - Average mineral matter and salt content, dry-weight basis, of "shell" oysters according to month samples were collected.

There appears to be a definite inverse relationship between the protein and the carbohydrate contents as indicated in figure 2. The protein content decreased to a minimum in May, when other constitutents were at the seasonal maximum, then increased sharply to a high value in August. The data in figure 2 show that the direction of changes in protein content is exactly opposite to that of the carbohydrate content for every month except the short period from December to February, when both constituents increased slightly. Actually, the protein content is probably least subject to change of all constituents, but as fat and carbohydrate contents decrease, the protein makes up a greater proportion of the remaining body tissue percentagewise.

The data in figure 3 show a surprisingly consistent decrease in mineral matter and in salt from October to April. Thereafter there was a fairly regular increase in these constituents until September, with values for September and October being only slightly lower than the high values found in October 1954. The explanation for the fluctuation in salt and the positively-correlated changes in mineral matter content is not known. This might reasonably be assumed to be related to the salinity of the water from which the oysters were taken. Information on this variable is not available but salinity would hardly be expected to show as uniform a cycle of change as is indicated by the data in figure 3, especially since a considerable and variable number of different and widely-scattered areas are represented in the monthly averages.

The data in table 1 show that the ranges for maximum and minimum values for the six constituents are quite large in many instances. This is almost entirely due to the seasonal variation already demonstrated. Although the oyster samples were not always obtained from the same plant each month, and oysters were often from

Table 1 - Data on the Composition of the Shell and the Plant Samples of Southern Oysters from October 1954 to October 1955 Inclusive

State	Number of Pairs of Samples1/	Dry Matter		On Dry Basis									
				Protein		Fat		Mineral Matter		Salt2/		Carbohydrates	
		"Plant"	"Shell"	"Plant"	"Shell"	"Plant"	"Shell"	"Plant"	"Shell"	"Plant"	"Shell"	"Plant"	"Shell"
		(Percent)											
Louisiana:	29												
Maximum		18.1	17.1	74.8	63.5	14.7	16.7	17.1	35.9	10.4	28.9	42.2	41.3
Minimum		5.9	6.9	40.9	36.8	6.8	5.6	4.6	6.4	1.1	2.8	7.1	8.1
Mean		11.2	11.5	56.0	51.3	11.0	10.1	9.8	16.5	4.6	10.8	23.1	22.3
Mississippi:	5												
Maximum		17.0	14.5	60.8	58.7	12.7	11.3	14.1	24.1	5.5	16.2	41.7	35.7
Minimum		10.9	7.5	40.6	37.3	8.8	8.0	5.1	13.9	1.3	9.7	18.9	15.6
Mean		13.5	11.2	49.1	45.1	11.3	10.0	8.9	17.9	3.2	12.4	30.7	27.1
Alabama:	11												
Maximum		15.2	13.6	60.1	56.8	16.5	14.6	12.4	24.6	6.7	18.2	37.2	34.8
Minimum		7.0	10.2	43.8	42.1	8.7	6.5	4.7	5.5	0.7	2.2	16.5	13.0
Mean		12.6	11.8	50.7	50.0	12.5	11.0	7.5	12.1	3.1	7.2	29.3	27.9
Florida:	6												
Maximum		17.5	12.3	61.4	52.8	13.5	10.5	18.3	30.3	10.1	22.4	35.4	34.8
Minimum		9.9	8.3	45.0	40.8	7.6	5.5	8.6	12.3	4.7	8.6	13.3	12.3
Mean		13.5	10.8	51.5	46.6	10.1	7.4	13.6	22.9	7.9	17.2	24.9	23.0
Georgia:	2												
Maximum		14.2	11.1	54.2	48.0	9.2	6.9	17.6	25.6	11.6	21.2	27.6	22.9
Minimum		13.9	10.3	51.2	45.9	7.6	5.7	12.0	24.3	6.8	18.3	20.6	20.8
Mean		14.1	10.7	52.7	47.0	8.4	6.3	14.8	25.0	9.2	19.8	24.1	21.9
South Carolina:	3												
Maximum		17.9	15.3	52.7	46.0	9.8	8.3	12.6	22.4	8.4	17.9	37.0	30.1
Minimum		16.3	12.1	46.1	44.7	5.8	6.8	9.2	15.9	5.5	11.5	25.5	25.3
Mean		17.3	13.5	49.7	45.4	8.3	7.7	11.3	19.2	6.5	14.7	30.1	27.7

1/ Pairs consist of one sample of oysters shucked directly from the shell and the other taken from regular plant production.
2/ Sodium chloride calculated from chloride content.

different growing areas even when the same plant was available as a sample source, the effect of these factors on the composition of the samples was largely masked by seasonal influences. Comparison of the averages for plant and shell samples in general show large differences only for mineral matter and salt.

CONCLUSIONS: Because of the large seasonal variation in all constituents, comparison between states of average values for the various constituents is hardly warranted. However, these averages, qualified by the data for individual sample pairs not shown in the table, seem to justify certain tentative conclusions, subject to confirmation from data for a second season:

(1) Oysters in all areas studied conform in a general way to the same seasonal cycle of variability for each of the constituents measured.

(2) The dry matter of most of the plant-washed samples is greater than for the comparable "shell" samples. This is a result of the usual practice of only washing the oysters on the skimmer with a spray nozzle, which gives a much shorter exposure to fresh water than occurs during blowing.

(3) There is a loss of salt amounting to from 55 to 60 percent for the "plant" samples as compared with the "shell" samples. Most of this loss is probably in the liquor drained off on the skimmer.

(4) The decrease in salt and in the mineral matter combined with the usual increase in dry matter results in an even larger apparent increase in protein and usually in carbohydrate for the "plant" samples as compared with similar values for the "shell" samples. These constituents are insoluble and thus constitute a greater proportion of the remaining solids.

(5) There is a marked decrease in the saltiness of the oysters in all areas from October to March. By May the salt content is increasing toward a September maximum. The reasons for this unexpectedly large and apparently cyclic fluctuation

in salt are not known. No data on salinities of the water in producing areas are available to determine the effect of this factor upon the salt content of the oyster.

The factors affecting the composition of the oyster are so numerous that interpretation of data, even with the 116 samples included in this series, is unsatisfactory in many instances, due to the small number of values for any single constituent. Samples for analysis for the second season, that is, the period from October 1955 to April 1956, have already been collected. No solution has been found for the various problems involved in obtaining more complete sample series from certain problem areas. Efforts were made to obtain the desired samples at various selected locations through the cooperation of (1) a plant owner, (2) an employee in a Fish and Wildlife Service Wildlife Refuge located very near two oyster plants, (3) a U. S. Public Health Service official who regularly visited one producing area to obtain samples for his own work, and (4) one of the university groups with an oyster research contract. The results ranged from fair to failure; none supplied a satisfactory series of samples. Particular credit should, however, be given to Dr. Arthur Novak at Louisiana State University. Through his efforts, complete series are available for two plants in New Orleans and quite satisfactory coverage for several plants in Mississippi and Alabama. The plant owners contacted everywhere have been uniformly cooperative in supplying the type of samples desired if visited when shucking was in progress and this cooperation is deeply appreciated.

Sample collections will be continued through October 1956 to provide data for a second complete year. Because of the virtual impossibility of obtaining satisfactory coverage of the South Atlantic Coast, it is not expected at this time to try to sample the whole area for a third season, unless unexpected and inexplicable differences are found between the data of the first two years.

SUMMARY: Data for average proximate composition of 16 samples of oysters collected from producing areas from South Carolina to Louisiana are presented tabularly by States, and by the type of sample, either "shell" as shucked; or "plant," that is commercially drained and washed on the skimmer. The values for certain constituents of the "shell" samples have been averaged by months when collected. These data are included in figures 1, 2, and 3, and indicate the type of seasonal fluctuation found. Comparisons are made entirely on dry basis. In general, dry matter, fat carbohydrate, mineral matter, and salt were at seasonal maxima in April and May, while minimum values were found in September and October. An inverse relationship was found for the protein content, that is, a May minimum and an August maximum. The study of composition of Southern oysters is being continued for a second season.

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EXPLORATORY FISHING VESSEL GEORGE M. BOWERS

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Part I - Description of Vessel

By Reidar F. Sand*

INTRODUCTION

The U. S. Fish and Wildlife Service commissioned the George M. Bowers at Miami, Fla., on January 7, 1956. It was built by Steam Ways Corporation of Tampa, Fla., to Service design specifications, with funds provided by the Saltonstall-Kennedy Act of 1954. This vessel will be used primarily in the Service's gear research and development projects and will assist in the program to investigate the fishery resources of the South Atlantic area. The vessel is operated by the Exploratory Fishing and Gear Development Section of the Service's Branch of Commercial Fisheries.

The George M. Bowers will first participate in exploration for new commercial shrimp and fishing grounds in the South Atlantic off the coasts of Florida, Georgia, North and South Carolina. Upon completion of this assignment the George M. Bowers will place emphasis on research in the field of fishing-gear development.

While substantially of shrimp-trawler design common to the Gulf and South Atlantic area, the vessel is modified for operation as a multipurpose fishing vessel capable of trawling, trolling, seining, long-lining, gill-netting, and live-bait fishing. Special equipment has been installed for research on fishing gear that is important to the commercial fisheries of the United States. For observing fishing gear in action, provisions have been made for installation of the Service's underwater television equipment. The vessel is equipped with a unique and versatile electrical system designed by Service technicians.

Fig. 1 - The George M. Bowers on a trial run.

The plans for the George M. Bowers were based largely on practical experience gained from operating other Service exploratory fishing vessels, and its design includes provisions for adaptation to the future needs of experimental and exploratory fishing. The operating area will be from Cape Hatteras, N.C., to the Gulf of Mexico and offshore waters. For this reason the George M. Bowers is

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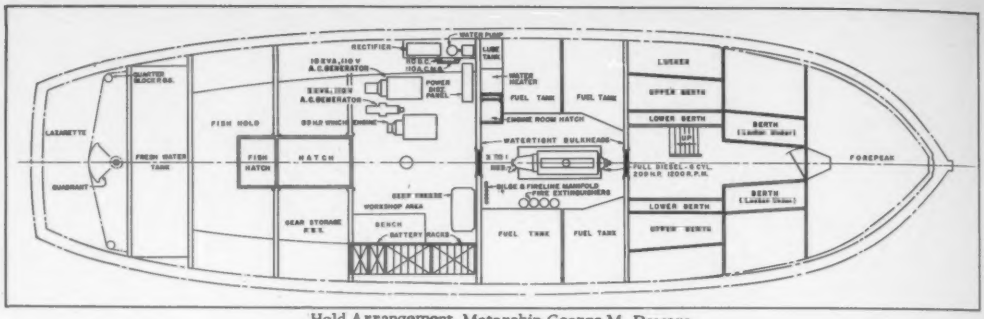
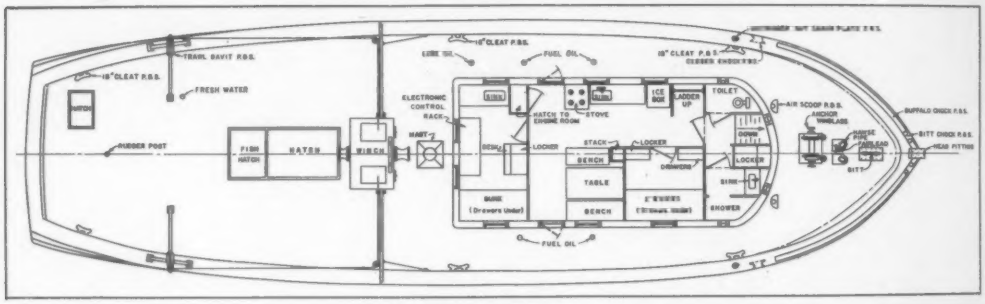
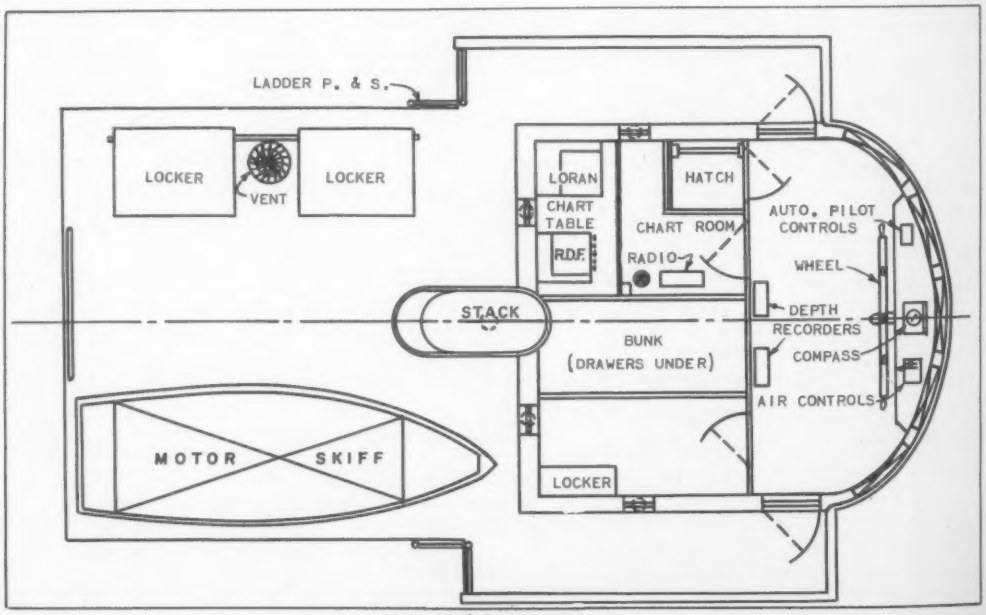


Hold Arrangement, Motorship George M. Bowers.



Main-Deck Arrangement.



Upper-Deck Arrangement.

strongly built, amply powered for a 5,000-mile cruising range, and equipped with the most modern navigational devices.

The vessel bears the name of the distinguished former United States Commissioner of Fisheries, George M. Bowers; he was Commissioner from 1898 to 1913, and in 1902-1903 was President of the American Fisheries Society. He was appointed to the House of Representatives from West Virginia in 1913 to fill an unexpired term and was re-elected, serving until 1923. Bowers died at Martinsburg, W. Va., December 7, 1925.

VESSEL SPECIFICATIONS

The vessel's construction is of wood with three transverse watertight bulkheads. Hull planking is of Douglas fir, and frames of oak are doubled and steam-bent. The deckhouse of cypress is standard double-side construction through-bolted to the deck. Interior deckhouse sheeting is of marine plywood. While the general design is that of the Florida shrimp trawler, there is considerable resemblance to the Pacific Coast combination seiner-trawler with deckhouse forward and clear deck space aft. To improve vessel handling qualities and trim under various fishing conditions, machinery spaces and tanks are disposed further aft than in conventional trawlers.

The vessel is built to the following dimensions:

Length over-all	- 73 ft.	Fresh water capacity	- 2,000 gals.
Beam over guards	- 21 ft., 6 in.	Lube oil capacity	- 125 gals.
Draft over keel	- 7 ft., 6 in.	Cruising speed	- 9.8 knots
Diesel fuel capacity	- 5,100 gals.	Maximum speed	- 10.2 knots.

Main propulsion power is supplied by a six-cylinder four-cycle Diesel engine built to American Bureau of Shipping Standards. The engine delivers 209 hp. at 1,200 r.p.m. through 3:1 reduction gear to a 50 x 40 four-blade propeller. A six-cylinder 50 hp. Diesel auxiliary engine is designed to drive the main trawl winch through a fluid coupling equipped with clutch and reverse gear. A four-cylinder Diesel engine-driven generator supplies 10 kw. for the vessel's electrical system of 110 and 220 volts a.c., and 32 and 110 volts d.c. A smaller 3 kw. Diesel generator supplements the 10 kw. generator. A main engine-driven high-pressure closed impeller-type pump delivers 100 gallons a minute at 80 pounds a square inch for bilge pumping, fire, and washdown services. A smaller auxiliary engine-driven low-pressure pump delivers 40 gallons a minute. The engine-driven pumps are supplemented by a three-inch hand pump located on deck.

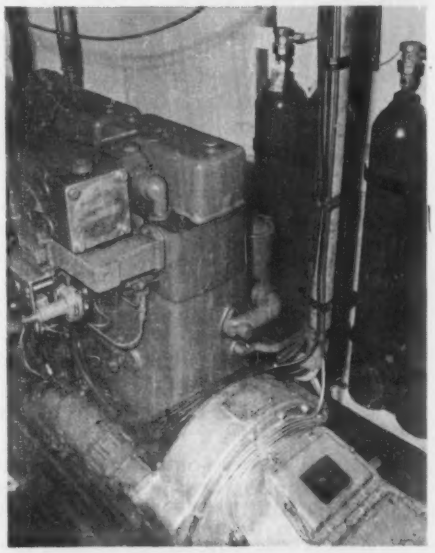


Fig. 3 - View of George M. Bowers' main engine and CO_2 system.

A 110-volt battery bank installed in the hold provides a quiet source of electrical power for underwater sound research on commercial species of fish. The vessel has a hold capacity for 10 tons of fish and ice because a large capacity was not thought to be necessary for experimental fisheries work. Machinery spaces below decks are protected from fire by automatic and manually-operated CO_2 systems. Guards are installed over all items of machinery where exposed moving parts may cause injury to personnel.

Deck machinery consists of an electrical motor-driven anchor windlass, and oceanographic winch, and a combination seine-trawl winch. The main double-drum trawl winch spools 500 fathoms of $\frac{7}{16}$-inch cable on each drum and may be modified

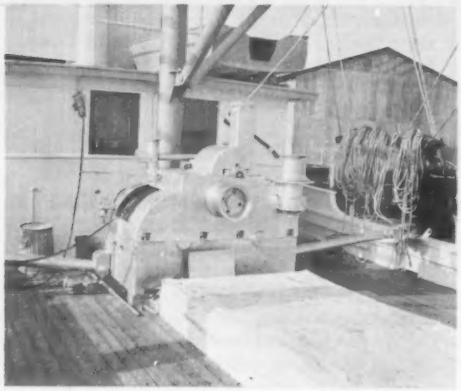


Fig. 4 - After deck showing main trawl winch.

Fig. 5 - After deck view showing trawl davits. Trawling may be done either with these davits or with the "Florida-type" trawling boom.

in a short period of time for seining, and long-line and gill-net hauling. An air ram-operated emergency stop control is a special feature of the main trawl winch installation.

The George M. Bowers may be rigged with various types of specialized fishing equipment which are readily portable. Among these are trolling poles, a bait tank, gallows frames for both the Florida-type and stern-set trawling rigs. The

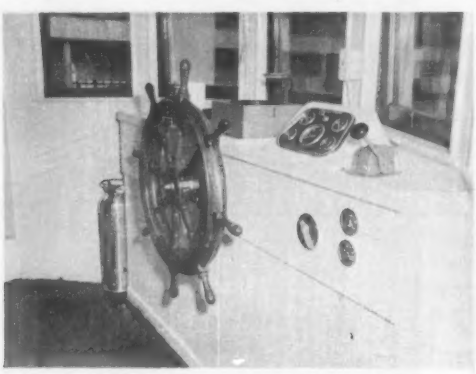


Fig. 6 - View of pilothouse showing wheel and engine controls.

Fig. 7 - View of sonic depth recorders in pilothouse and radio in chartroom.

vessel will also be outfitted with such hydrographic gear as bathythermographs, bottom-sampling devices, and reversing thermometers. A laboratory space with sink is provided in the after section of the deckhouse.

Electronic equipment aboard includes:

1. Sonic depth recorder, 0 - 200 fathoms
2. Sonic depth recorder, 0 - 700 fathoms
3. Radiotelephone, 70 watts
4. Radiotelephone, 75 watts
5. Radio-direction finder
6. Direct-reading loran receiver.

In addition to manual steering, the vessel is equipped with a nonhunting-type automatic pilot. An emergency tiller may be quickly attached with removal of a deck flange above the rudder post. In tests and trials the vessel exhibited fine qualities of maneuverability and seaworthiness. A separate chart and instrument room has been provided because of the need for these facilities. Quarters are provided for four scientists in addition to crew space for six.

Six berths are located in the forecastle, two in the deckhouse, and one in the laboratory space. Separate quarters are provided for the captain adjacent to the wheelhouse.

A desirable feature of the George M. Bowers not usually found in fishing vessels of this size is the provision for inside access to working areas, quarters, and storage spaces. This provision for crew comfort is a definite advantage to the multipurpose fishing or exploratory vessel, and was accomplished without loss of space or special arrangements.

Part II - Vessel's Electrical and Auxiliary-Drive Systems

By Richard L. McNeely*

ELECTRICAL SYSTEM

The design of the electrical system of the George M. Bowers fulfills a variety of requirements and makes provision for future possible needs. Of particular note in the installation are features of economy both to the initial cost of the installation and to operational and maintenance expenses.

The larger of the generating plants is 110-volt a.c. single-phase and is rated at 10 kv.-a. The unique design and installation features of the system permits, without overload, intermittent operation of:

Galley range	220 v. a. c. -	200 to 10,000 watts
Thirty-gallon hot-water heater	110 v. a. c. -	1,800 watts
Galley refrigerator	110 v. a. c. -	90 watts
Fourteen cu.ft. deep-freeze unit	110 v. a. c. -	100 watts
Deck flood lights	110 v. a. c. -	600 watts
Deckhouse lighting and wiring circuits	110 v. a. c. -	250 watts
The air compressor	110 v. a. c. -	75 watts
Battery-charging rectifiers	.110 v. a. c. to 110 v. d. c. -	500 watts
Ventilation blower	110 v. a. c. -	100 watts
Fresh-water pump	110 v. a. c. -	80 watts
Anchor winch	110 v. a. c. -	3,000 watts
Navigational aids	110 v. a. c. -	250 watts

and other minor equipment.

Additional auxiliary power is furnished by a 3-kv.-a. 110 volt a.c. generator and 32-volt battery charger. The battery-charging unit is tapped off of a 32-volt generator field exciter.

The main propulsion engine drives one 1,500-watt 32-v. d.c generator and one 3,000-watt 110-v. d.c generator. A motor generator set allows power conversion

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to a.c. The electrical energy produced by the 3,000-watt generator is stored in a 110-volt bank of batteries. Principal use of the motor generator set is a source of emergency a.c. power and a quiet source of a.c. power required in underwater sound experimental work.

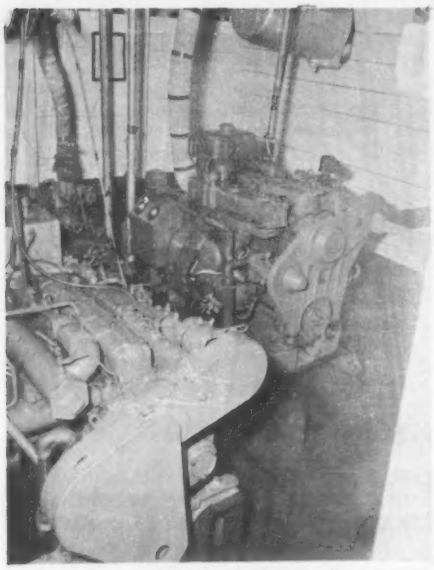


Fig. 8 - View of George M. Bowers Diesel auxiliaries.

All control switches in the 110 v. a.c. and 110 v. d.c. and 32 v. d.c. are of the circuit-breaker type. Plug-in receptacles for all three types of current are provided in the laboratory space and in the radio chartroom. Dissimilar types of plug-in prongs and receptacles prevent error in selection of power source.

The 32-volt system is used for engine cranking only to insure longer battery life. All engine-starting systems are isolated as added protection against electrolysis. All major equipment is bonded with heavy-gauge copper wire and grounded to a keel-mounted grounding buss. Either 220-volt single-phase or 110-volt single-phase shore power may be introduced for ship supply. This is accomplished by means of one air-cooled 10 kv. a. 110-220 volt transformer. An isolation transformer removes shore power grounds from the system.

To prevent even temporary loss of navigation lights due to a.c. power-plant failure, navigation lights are 110 volt d.c. A reserve of power in the 110-volt battery bank would allow from 5 to 10 days of operation without re-charging. With this bank of batteries and a motor generator set, all 110-volt a.c. navigational equipment would be of service in emergencies. Of particular importance is the fact that this electrical system has been designed so that no switch on either the main or auxiliary distribution panels may be thrown in such a manner as to damage the electrical system or any of its equipments in any way.

Fig. 9 - View of power-distribution panel, showing 110 v. a.c., 110-v. d.c., 32 v. d.c controls, and isolation transformer.

WINCH-ENGINE AUXILIARY DRIVE

An unusual power take-off installation aboard the George M. Bowers allows a 50 hp. auxiliary Diesel engine to perform double duty.

This engine is equipped with clutch and reverse gear and by means of a fluid coupling-type torque converter provides power requirements in varying amounts for the combination deck winch.

In numerous operations in fishery investigations, such as the towing of smaller nets, trolling, and underwater sound and television work, slower vessel speeds are

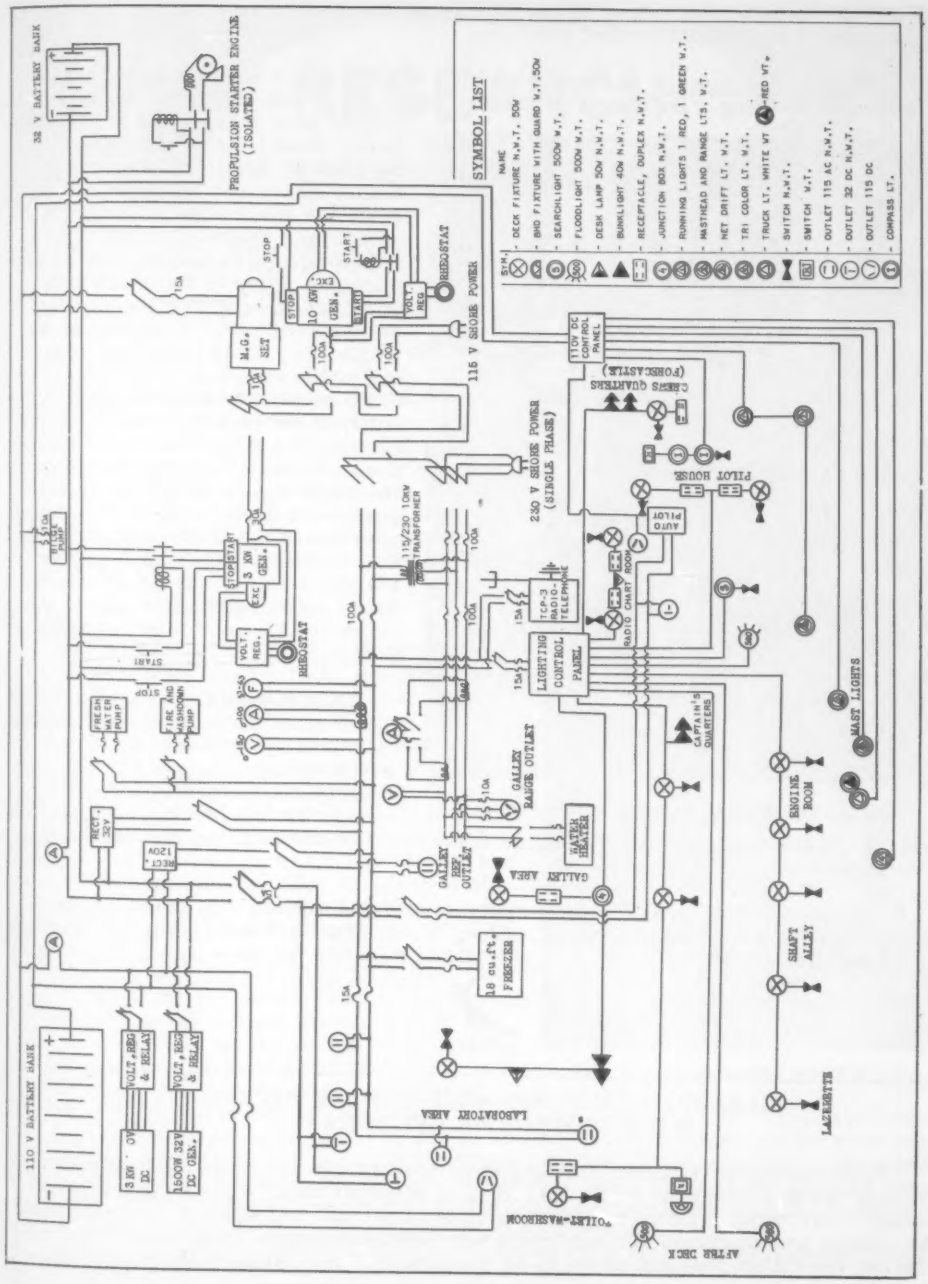


Fig. 10 - Diagram of George M. Bowers' electrical system.

required for extended periods of time. These slower speeds tend to foul larger engines and are not recommended practice.

The George M. Bowers is equipped with a sailing clutch between main engine and propeller shafting. By means of another chain drive take-off from the winch-engine jack shaft to the main propeller shaft, the winch engine may be used as auxiliary engine power. Roller chain and sprocket drive from the winch engine turns the winch jack shafting at 192 r.p.m. A two-to-one reduction in the chain sprocket drive to the main shaft provides through the torque converter 0-96 turns a minute at the propeller. This gives the vessel a flexible range of speeds from 0-3½ knots for extended periods of time, if necessary. A special feature of this dual function is that in the event of winch-engine failure the main engine might be used to power the deck winch for certain operations. Another advantage is that in the event of main-engine starter failure, the winch-engine drive and torque converter might be used as a source of cranking power.

Fig. 11 - View of George M. Bowers' auxiliary drive.

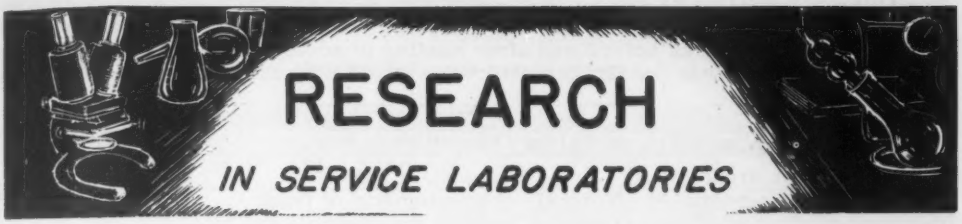
A standard friction-type clutch attached to the torque converter is operated by air controls at the winch operator's position on deck. A simple arrangement of quick change crossover valves will allow either the main-engine or winch-engine drive to be operated from the wheelhouse air controls.

A similar type arrangement was made aboard the exploratory vessel John N. Cobb in 1950 for slow-speed trolling. (See: U. S. Fish & Wildlife Service Fishery Leaflet No. 385, Part II, "John N. Cobb Uses New Rig for Slow Speed Trolling.")

GLAZING SHRIMP NOT NECESSARY IF PACKED WITH PROTECTIVE OVERWRAP

Experiments have shown that unglazed raw shrimp can be held satisfactorily for long-term storage at 0° F. (-17.8° C.) when packaged in waxed cartons with suitable overwrap. Tests by a tasting panel are reported to have indicated that the glazed and unglazed shrimp could not be distinguished from each other. A glazing operation does not seem to be necessary if the package has a protective overwrap.

--Gulf and Caribbean Fisheries Institute, Abstracts, 1953



STORAGE TESTS ON FROZEN FRIED FISH STICKS PREPARED FROM PACIFIC COD

INTRODUCTION

West coast producers of fish sticks have needed reliable information on the quality changes and on the maximum storage life of frozen fried fish sticks made from Pacific cod (Gadus macrocephalus). The purpose of the work reported here was therefore (1) to study the quality changes in fried fish sticks prepared from Pacific cod during a 1-year storage period at 0° F. and (2) to determine the maximum period that the fish sticks can be stored at 0° F. in good marketable condition.[1/]

PROCEDURE

PREPARATION OF FISH BLOCKS: Pacific cod of good quality from Hecate Strait, held in the round 4 to 5 days in ice, were used. The fish were obtained from the top of the load on the fishing vessel, and only firm fish with good skin color and with no softening or bruises were selected. The fish were filleted, skinned, trimmed, deboned, and packed into 9-pound heavily-waxed cartons (3¾ inches x 9¼ inches x 11¼ inches) and blast-frozen at -25° F. The resulting fish blocks were stored at 0° F. for 6 days prior to being processed into fish sticks.

Examining fish sticks after storage at 0° F.

PREPARATION OF FISH STICKS: The fish sticks were prepared commercially from the fish blocks at a local plant. The blocks were cut into fish sticks with a band saw; the fish sticks were covered with batter and breaded with standard commercial ingredients, and deep-fat fried at 380° F. for 55 seconds in hydrogenated oil[2/] that had been used in fish-stick processing for about 20 hours. The fried fish sticks were blast-air cooled, then packaged in 10-ounce waxed cartons, 10 to a carton, with a wax-paper overwrap. These cartons were frozen in a plate freezer for 2 hours and were then left at -20° F. overnight. Lastly, the cartoned frozen fish sticks were cased and stored at 0° F. in the Laboratory cold storage.

1/ The rating "good marketable condition" is defined as being equivalent to not less than grade B (a minimum score of 70 points) in the proposed United States Standards for Grades of Frozen Fried Fish Sticks.

2/ The ratio of tank capacity to hydrogenated-oil consumption per day was about 2½ to 1.

ORGANOLEPTIC EXAMINATION PROCEDURE: The samples were organoleptically judged at approximately monthly intervals. Quality evaluations were made on the frozen fish sticks before and after heating in accordance with the proposed United States Standards for Grades of Frozen Fried Fish Sticks.3/ The frozenfish

Table 1 - Scale of Organoleptic Ratings

Description of Flavor and/or Odor of Fish Sticks		Organoleptic Rating
Whole Fish Stick	Component Parts1/	
Normal, characteristic of fresh product; no off-flavor or off-odor.	Normal, characteristic of fresh product; none to trace off-flavor or off-odor; barely noticeable.	Good (Grade A)
Lacking normal flavor or odor of fresh product; none to slight off-flavor or off-odor; barely noticeable.	Lacking normal flavor or odor; slight to moderate off-flavor or off-odor; definitely noticeable but not objectionable.	Reasonably Good (Grade B)
Slight to moderate off-flavor or off-odor; definitely noticeable but not objectionable.	Moderate off-flavor or off-odor; definitely noticeable; objectionable in localized areas only.	Fair (Substandard)
Strong or objectionable off-flavor or off-odor; distasteful but not repugnant.	Strong or objectionable off-flavor or off-odor; diffusing throughout adjacent tissue.	Poor (Out of Grade)

1/ Breading, dark meat (including the layer of skin fat), and light meat. (Each of these parts is judged separately and the rating is on the basis of the worst condition observed.)

sticks were heated by spacing them $\frac{1}{4}$-inch apart on a metal tray and then placing the tray in a properly-ventilated oven preheated to 400° F. At the end of 16 minutes, the tray of fish sticks was removed and the fish sticks were examined by a panel of 4 to 7 people experienced in the organoleptic testing of fish.

Under the proposed United States Standards for Grades of Frozen Fried Fish Sticks, a grade A product must have good flavor and odor and score not less than 85 points on other factors. A grade B product must have reasonably good flavor and odor and score not less than 70 points on other factors. A substandard product is one that fails to meet the requirement for grade B. Under these fish-stick standards, the quality rating (grade) is determined, in part, by physical factors not especially subject to change during cold storage, such as uniformity of size and shape, color, continuity of the coating, degree of oiliness or crumbliness, and presence of defects (broken and damaged sticks, bones, and blemishes). The quality rating is also determined, in part, by organoleptic factors of texture, flavor, and odor--which are subject to change. The organoleptic rating of the present samples of fish sticks was based on the flavor and odor of the whole fish stick (breading plus fish, as a unit) and on the separate evaluation of the breading, the light meat, and the dark meat (including the layer of skin fat).

In order that these generalized fish-stick standards could be implemented, detailed examination procedures and the scale of organoleptic ratings shown in table 1 were developed. In the development of this scale, consideration was given to the fact that an off-odor or flavor--for example, rancidity--tend to localize in critical areas, such as in the layer of skin fat. Evaluation of these critical areas is important, since if only the whole stick is tested, an off-flavor in a critical area may not be noticed and the test will be less sensitive. Flavor and odor were therefore judged separately on the whole stick and on the breading, dark meat (including layer of skin fat), and light meat.

The termination of the maximum period of storage for fish sticks in good marketable condition was taken to be that time at which rancidity and any off-odors and/or

3/ These standards were published in the Federal Register on April 26, 1956, by the Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C.

flavors were definitely noticeable (moderate in intensity) in any component part of the fish stick but were not objectionable.

RESULTS AND DISCUSSION

The data on the organoleptic observations are given in table 2. As indicated in the table, the maximum period that these fish sticks could be stored at 0° F. in good marketable condition was 8 months.

Despite the initial appearance of trace rancidity in the skin-fat layer at the end of 3 months of storage, and the advance of rancidity to slight at the end of 5 months of storage, no noticeable increase in rancidity was observed during the next 2 months. However, after 8 months of storage, rancidity was definitely noticeable (moderate in intensity) in the skin-fat layer and it was detectable in the adjacent light meat but was not otherwise detectable in the light meat. At this stage, the fish sticks were considered to be reasonably good in flavor and odor and in Grade B. After 9 months and after $11\frac{1}{2}$ months of storage, they were considered to be fair in flavor and odor and in the substandard grade.

Table 2 - Organoleptic Ratings of Pacific Cod Fish Sticks[1/] Stored at 0° F.

Storage Time	Observations	Rating	Grade
Months			
0	Good, sound product.	Good	A
1	No decrease in quality.		
2	Slight toughening in texture of meat.		
3	A trace of rancidity detectable in skin-fat layer but definitely not detectable in white-meat portion.		
5	Slight rancidity detectable in skin-fat layer but not detectable in white-meat portion. Some tasters detected trace of off-flavor in breading.	Reasonably Good	B
6	No further noticeable change in rancidity.		
7	No further noticeable change in rancidity.		
8	Slight off-flavor due to rancidity detectable in whole stick. Rancidity definitely noticeable (moderate in intensity) in skin-fat layer and in dark meat, and detectable in adjacent light meat but not otherwise detectable in light meat. Light meat, when slightly warm, moderately tough and characterized by slight dryness and slight woodiness of texture but, when hot, not noticeably tough, dry, or woody.		
9	Slight further decrease in quality.	Fair	Substandard
$11\frac{1}{2}$	Slight further decrease in quality. Rancidity advanced but other off-odors or flavors not apparent. Fish sticks considered barely marketable, owing to rancidity.		

1/ Prepared from good-quality cod by deep-fat frying at 380° F. for 55 seconds in hydrogenated oil that had been used in fish-stick processing for about 20 hours.

Although the hydrogenated cooking oil employed in this experiment had been used in fish-stick processing for about 20 hours, the age of the oil was apparently not a factor in the storage life. Rather, the limiting factor was considered to be the oxidative changes in the dark-meat skin-fat layer. The use of poorer-quality fish, older fish blocks, or higher storage temperatures and otherwise poorer storage conditions would undoubtedly have reduced the storage life of the fish sticks.

CONCLUSIONS

(1) The quality changes most critically affecting the storage life of frozen fried fish sticks made from good-quality Pacific cod (Gadus macrocephalus) prepared under commercial conditions (deep-fat fried at 380° F. for 55 seconds in hydrogenated oil that had been used in fish-stick processing for about 20 hours) and stored at 0° F. were the oxidative changes in the layer of skin fat in the dark meat.

(2) The maximum period that fried fish sticks, produced from good-quality Pacific cod under the conditions of this experiment, can be stored at 0° F. in good marketable condition 4/ was organoleptically determined to be 8 months.

4/ For explanation of footnote see footnote 1/ on page 15.

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EFFECT OF RAW MATERIAL ON TUNA-MEAL QUALITY

BACKGROUND

Fish meals show considerable variation in their nutritive value--even when manufactured from the same species of fish and by the same process. An important phase in the determination of the causes of this variation is a study of the protein quality of the meals. Work on such protein-evaluation studies was started several years ago by Dr. C. R. Grau in the Poultry Husbandry Department of the University of California. At that time Dr. Grau found considerable variation in the nutritive value of fish meals, but he was not able to continue the studies long enough to determine the causes for this variation.

In studies that have been undertaken by the U. S. Fish and Wildlife Service on the quality of fish meal, a large number of samples have been collected from reduction plants located in the important fishing centers of the United States. These samples are being tested at several laboratories for different variables. In collaborative studies at the Poultry Husbandry Department of the University of California, chicks have been used to test the meals for protein quality. In addition, a systematic search has been undertaken to determine the causes for the differences in the protein quality of tuna meals. This phase report will describe the work that has been done to the present on the effect of raw material on the nutritive value of the meal.

SAMPLE COLLECTION AND PREPARATION

The samples used for these studies were collected at San Pedro, Calif., in May 1955. The following portions from skipjack tuna (Katsuwonus pelamis) were collected: raw skin, raw caecae, raw livers, raw loins, cooked loins, and cooked heads. Hearts from skipjack were not available, but hearts from yellowfin (Neothunnus macropterus) were obtained and used instead. The tuna from which the samples were taken were of marginal quality.

Each of the selected portions was ground and blended in an electric food chopper and then was packed in six 1-gallon press-top cans (but only one-half of a can in the case of the skin). The one-half can of skin and two cans of each of the other portions were placed in frozen storage. The four cans remaining of each of the portions were allowed to stand at the open-air temperature for 2 days (48 hours), at the end of which time two cans of each of the raw portions were placed in the freezer. The next day (72 hours), two cans of both cooked and raw portions were put into the freezer. After 7 days (168 hours), the remaining two cans each of the cooked loins and the cooked heads were put in the freezer. During the period that the material was allowed to stand in the open, the temperature ranged from 56° to 66° F. The cans, when placed in the freezer, were fresh-frozen at -20° and then held at 0° F. After all the samples had been assembled and frozen, they were sent to the Poultry Husbandry Laboratory of the University of California, where they were lyophilized (freeze-dried) prior to being incorporated into test diets. The treatments given the various samples are summarized in table 1.

Table 1 - Treatment of Samples

Sample	Frozen Immediately[1]	Held at 56°-66° F. for 48 Hours and Then Frozen[1]	Held at 56°-66° F. for 72 Hours and Then Frozen[1]	Held at 56°-66° F. for 168 Hours and Then Frozen[1]
	(Number of Cans)			
Raw skin	½	-	-	-
Raw caecae	2	2	2	-
Raw livers	2	2	2	-
Raw hearts	2	2	2	-
Raw loins	2	2	2	-
Cooked loins	2	-	2	2
Cooked heads	2	-	2	2

1/ Frozen at -20° F., stored at 0° F., and then lyophilized for incorporation into test diets.

EXPERIMENTAL PROCEDURE

The bioassay utilized 10-day-old male chicks for the protein-evaluation studies. Enough fish protein to provide 20 percent crude protein in the final diet was added to a basic mixture of essential dietary components. The basal mixture and the procedure used for the chick-feeding tests were those described by Grau and Williams (1955). Modifications were made, however, on housing and on replication procedure. Special cages adapted from rat cages made it possible to conduct nine treatments simultaneously, with high accuracy. Each fish meal was fed to four groups (one treatment) with four chicks per group. These modifications were made to obtain the greatest amount of information from the smallest sample size. The protein was evaluated by the rate of growth of the 16 chicks during an 8-day test period.

RESULTS OF FEEDING TESTS

In the tests using the unspoiled material, the raw skin and the cooked heads produced poor growth, but all of the other materials produced good growth.

For the tests using the spoiled material, the same growth was obtained as with the unspoiled material, except with the cooked loins. Whereas the spoiled raw loins produced good growth, the spoiled cooked loins produced an actual weight loss in the chicks. The growth rate of the chicks was not improved when the spoiled cooked loins were autoclaved for 15 minutes at 15 pounds pressure, indicating that the negative growth was not caused by heat-labile toxin. Similarly, the growth rate was not improved by the addition of chlortetracycline (aureomycin) at 10 micrograms per kilogram, indicating, in addition, that the negative growth was not caused by pathogenic bacteria.

DISCUSSION

The negative growth response obtained with the spoiled cooked loins indicates that the condition of the raw material may be an important factor in the nutritional value of the tuna meal. The results offer a number of possibilities for future studies. Since the indications are that the negative growth was caused neither by heat-labile toxin nor by pathogenic bacteria, the probable cause was damage to the protein. These feeding tests were repeated, and the results verified. Further spoilage studies are being conducted under more rigidly-controlled conditions with several species.

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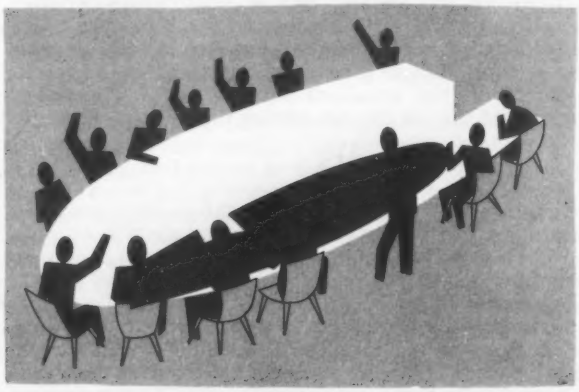
1955. Fish Meals as Amino Acid Source in Chick Rations. Poultry Science, vol. 34, no. 4, July, pp. 810-817.

RESEARCH PROGRAMS DISCUSSED AT PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE

At the Seventh Annual Conference of the Pacific Fisheries Technologists, held at Gearhart, Ore., March 18-21, the current status of some of the Fish and Wildlife Service's contract research with Saltonstall-Kennedy Act funds was discussed. Maurice Stansby of the Seattle Fishery Technological Laboratory presided at this session of the meeting and outlined some of the programs under way in the new Fish and Wildlife Service research program on fish oils and fish meals. Details of several of the programs were discussed by those project leaders who were in attendance at the meeting.



Dr. Walter O. Lundberg of Hormel Institute, University of Minnesota, Austin, Minn., described the three programs under way in his laboratories on (1) composition and analysis of fish oil fatty acids, (2) separation of fish oil fatty acids by employment of inclusion-type compounds, and (3) the chemistry of compounds responsible for odor in fish oils.

Dr. W. Duane Brown described the collaborative program under way at the Food Technology Department, University of California, at Davis, on oxidative deterioration in fish and fishery products. Results of experiments were discussed on

the mechanism of oxidation of oil in fish tissue, on application of antioxidants to retarding of such oxidation, on the reaction between fish oil and protein in such fishery products as fish meal, and on alterations in pigments such as those resulting in green tuna.

Dr. J. E. Oldfield of the Animal Husbandry Department, Oregon State College, Corvallis, Ore., discussed his program on incorporation of fish oil in the diet of swine and its effect on growth and on quality of the resulting meat. Dr. C. R. Grau of the Poultry Husbandry Department, University of California, at Davis, discussed the collaborative program on nutritive value of protein in fish meals. Dr. E. Geiger of the Pharmacology Department, University of Southern California, described experiments under way on unidentified growth factor assays.

John Dassow of the Seattle Fishery Technological Laboratory discussed at another session of the conference the Service's program of development of voluntary grade standards for fishery products.

PROGRESS IN RESEARCH ON SOUTHERN OYSTERS

The three university groups conducting research related to technological improvements for the Southern oyster industry **are well started on their second year.** They reported recently that satisfactory progress is being made in every phase of the work. One report of the work conducted at Tulane University is already published under the title, "Osmotic Behavior and Bleeding in the Oysters (Cyassostrea virginica)," by M. Fingerman and L. D. Fairbanks, in Tulane Studies in Zoology, vol. 3, no. 9, April 12, 1956. Three reports are now in editorial hands; and three or four additional reports on the work done in the first year are expected to be received within 45 to 60 days.

Placing oysters in equipment for sterilization by gamma radiation.

The work during the second year has been expanded at Louisiana State University, with four lots of oysters being prepared for frozen storage tests in contrast with one in the first season. Florida State University reports unexpectedly encouraging results in the latest experiments on sterilization of oysters by irradiation with Cobalt 60. The thiobarbituric acid tests have also been developed to give a quite satisfactory method of following oxidative rancidity affecting quality of stored oysters. They expect to develop many more cooked oyster products and dishes for frozen storage studies this season. At Tulane University recent work has related to study of liquor losses of imported "Northern" oysters under identical conditions used in their work with the local product. Major emphasis of work during the coming year will be on more intensive study of the internal mechanism of the live oyster which is responsible for regulating the amount and composition of body fluid losses.

Note: See also Commercial Fisheries Review, April 1956, p. 9.

NEW TECHNIQUES FOR FREEZING AND STORING NORTH ATLANTIC LOBSTERS

In order to make possible the utilization of the large quantities of deep-sea lobsters discovered by the Service's exploratory fishing vessel Delaware in the Georges Bank fishing area off the coast of Massachusetts, experiments have been conducted by the Fish and Wildlife Service Technological Laboratory at East Boston, Mass., to determine (1) the feasibility of freezing lobsters aboard a fishing vessel, and (2) means of increasing the storage life of frozen lobster meat. The following report concerns the results so far obtained regarding these experiments:

FEASIBILITY OF FREEZING LOBSTERS ABOARD A FISHING VESSEL: A sodium-chloride brine (22 percent salt by weight), used successfully for freezing New England groundfish aboard the Delaware, was tried as a freezing medium for whole or butchered cooked[1]/ lobsters. Lobsters landed on the vessel were immediately cooked in a barrel containing sea water heated by steam from the vessel's boiler. After cooking, these lobsters either whole or butchered (by removing the tails and claws) were put into polyethylene bags, frozen to 0° F. in the vessel's brine-immersion freezer, and stored at 0° F. in the refrigerated hold. Examination of these lobsters when landed showed that 50 percent of the bags used had been torn or punctured by the sharp spines on the claws of the lobsters. This caused intimate contact between the lobsters and brine during freezing, resulting in excessive salt penetration into the meat. As a result of this salt penetration, lobsters contained in polyethylene bags that were punctured were inedible when examined one week after being frozen. Lobsters in polyethylene bags that were not punctured lost their characteristically pleasing flavor and were tough and dry three weeks after being frozen and stored at 0° F. Such a method of freezing therefore was not suitable.

Large, deep-water, left-handed lobster captured on the southeastern edge of Georges Banks. The utilization of this newly-discovered resource has been delayed pending development of methods of preservation on board the vessel.

In view of these findings, it was thought that the use of a freezing solution which provides a protective glaze on the frozen lobster and which does not cause excessive salt penetration into the lobster meat might be successful. A glucose (34 percent)-salt (12 percent) solution used in small-scale tests in the laboratory's project on freezing fish at sea seemed to have the desired properties. To determine the possibility of freezing cooked whole lobsters in a glucose-salt solution aboard the fishing vessel, landing the lobsters in a frozen condition, thawing ashore, vacuum packing the meat in cans, refreezing, and storing the frozen meat, the following pilot-plant experiment was performed:

Cooked whole lobsters were precooled to a temperature of 45° F. in running fresh water prior to freezing. Some of these lobsters were then butchered and others were left whole. Both lots were cooled to 0° F. by immersion in the glucose-salt freezing solution. Once frozen, some were left without packaging and some were packed in polyethylene bags. These lots were then stored for two weeks (to simulate the length of time they might be kept at sea aboard the fishing vessel) at 0° F. and -20° F. They were then thawed, the meat picked out and packed in C-enamel lined cans under a vacuum of 27 inches of mercury, frozen, and stored at 0° and -20° F.

1/ Earlier tests on frozen lobsters showed that when whole frozen uncooked lobsters were cooked, the meat stuck very tightly to the shell and was extremely difficult to remove. Therefore, in this experiment the lobsters were cooked prior to freezing.

After 8 weeks from time of freezing the whole lobsters, no deterioration in the quality of the meat had occurred. The lobsters butchered before freezing in the glucose-salt solution were slightly, but not objectionably salty, due to small amounts of salt penetration into the meat. However, no salt penetration was noted in the lobsters frozen whole.

The glucose-salt freezing solution used seemed to provide a protective glaze which contributes greatly to the storage life of frozen whole lobsters. These results indicate that freezing of deep-sea lobsters aboard a fishing vessel is a definite possibility. Tests on a larger scale will be conducted.

STORAGE LIFE OF FROZEN LOBSTER MEAT: A number of deep-sea lobsters brought in alive by the Delaware were cooked, and the meat vacuum-packed in C-enamel cans under a vacuum of 27 inches of mercury, frozen, and stored at temperatures of 0° and -20° F. The following results were obtained in these tests:

Cooked lobster meat thus packed in cans, frozen, and stored at 0° F. showed loss of texture and flavor in 6 to 8 weeks. Storage at -20° F. increased this storage life to 10-12 weeks. By adding a 2.5 percent salt solution to the canned meat and storing it at 0° F. a storage life of 12 to 14 weeks was obtained. Tests are presently being conducted on the storage life of cooked lobster meat packed with a 2.5-percent salt solution under a vacuum of 27 inches of mercury and stored at -20° F., and on the effect of different levels of vacuum on the storage life of frozen lobster meat.

--JOHN A. PETERS, FISHERY PRODUCTS TECHNOLOGIST,
--JOSEPH W. FLAVIN, REFRIGERATION ENGINEER,
FISHERY TECHNOLOGICAL LABORATORY,
BRANCH OF COMMERCIAL FISHERIES,
U. S. FISH AND WILDLIFE SERVICE, EAST BOSTON, MASS.

SHARKS ARE EDIBLE

Sand sharks, and almost all other kinds of small sharks, are edible. Very large sharks and hammerhead sharks should not be eaten. A prejudice exists against the consumption of shark meat, but this is largely unfounded. Perhaps it is partly due to the fact that shark meat spoils more quickly than that of other fish. This is particularly true of the dark portion. Actually shark is eaten in many parts of the world, although sometimes it is given names which conceal its identity.

To prepare shark meat for food, cut fillets of the light meat about 9 by ½ inches thick and wash them thoroughly in salt water. Place the fillets in ice or in a refrigerator for about 24 hours, or soak them in a clean cold brine for about 6 hours. If they are kept on ice or in the refrigerator, a brine soak of about 2 hours will be sufficient. The fillets should be used immediately or else frozen. They can be boiled or fried.

--"Sea Secrets," The Marine Laboratory,
University of Miami, Coral Gables, Fla.

Additions to U. S. Fleet of Fishing Vessels

A total of 47 vessels of 5 net tons and over received first documents as fishing craft during April 1956, according to the U. S. Bureau of Customs. This was 11 vessels more than the number reported for the same month of 1955.

The Gulf area led all others during April 1956 with 14 newly-documented craft, followed by the Pacific area with 10; the Chesapeake and Alaskan areas with 9 each; the South Atlantic with 3; and the New England and Middle Atlantic areas with 1 each.

Table 1 - U. S. Vessels Obtaining First Documents As Fishing Craft, by Areas, April 1956 and Comparisons

Area	April		Jan. - April		Total
	1956	1955	1956	1955	1955
	(Number)				
New England	1	1	6	7	18
Middle Atlantic	1	2	8	5	13
Chesapeake	9	2	21	11	54
South Atlantic	3	6	14	15	65
Gulf	14	10	29	29	103
Pacific	10	9	14	26	117
Great Lakes	-	-	2	2	9
Alaska	9	4	12	12	35
Hawaii	-	2	1	2	3
Virgin Islands	-	-	-	-	1
Total	47	36	107	109	418

Note: Vessels are assigned to various sections on the basis of their home port.

Table 2 - U. S. Vessels Obtaining First Documents as Fishing Craft, by Tonnage, April 1956

Net Tons	Number
5 to 9	26
10 to 19	7
20 to 29	5
30 to 39	6
40 to 49	1
50 to 59	1
109 to 120	1
Total	47

The State of Texas was credited with 50 percent of the newly-documented craft reported for the Gulf area during April. During the month there were 2 vessels each documented for the first time as fishing craft with registered home ports on the west coast of Florida and in Mississippi and Louisiana. Alabama had 1 newly-documented vessel during the month. Among the Pacific Coast States, Washington led all others with 6 of the 10 vessels credited to the area. The State of California had 3 and Oregon had 1.

During the first four months of 1956, a total of 107 fishing vessels was documented for the first time--only 2 less than the number reported for the corresponding period of last year. During the first four months of 1956, the Gulf area led all others with 29 newly-documented vessels--the same number reported for the corresponding period of last year.

Alaska

BAIT HERRING PREPARED BY NEW METHOD: Over 3.3 million pounds of herring were frozen this season in the Ketchikan, Alaska, area for use as bait. Of this amount a considerable portion is diverted to the sport fishing trade. At the time herring were being prepared, a different method of preparing bait for sports

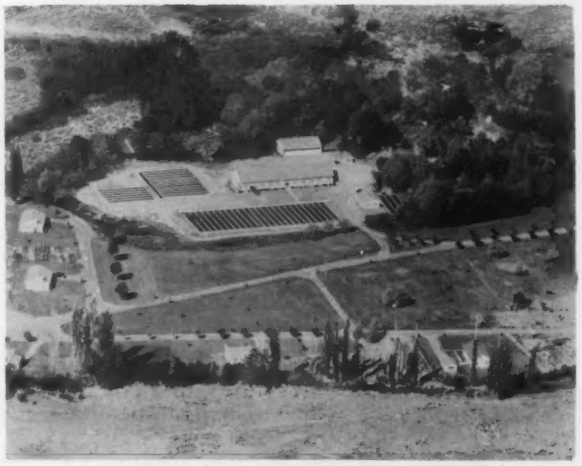
fishing was observed. Instead of allowing the fish to die in the usual manner, the herring were brailed alive and placed in a small tank where they were killed by means of an electrical current. The herring were then frozen individually and packaged in convenient size fiber containers. The advantages claimed for this method of preparation are that the herring do not lose their body scales and are therefore brighter and more natural appearing than are herring prepared by other methods. As the herring are frozen individually, it is not necessary for the fishermen to break up a block of fish each time he desires new bait.

Biological Studies Aid Sport Fishermen

Studies designed to put more fish in the sport fishermen's creel are being conducted in eight laboratories operated by the U. S. Fish and Wildlife Service, the Service's Director announced on May 15. Results of these studies are made available to state conservation officials and others interested in the propagation of fish.

Nutritional studies for trout and salmon are being made at Cortland, N.Y., and at Willard, Wash., respectively. At Leetown, W. Va., and at Seattle, Wash., studies are being made on the various diseases of trout and salmon, particularly those diseases which strike at fish in the hatcheries. Studies at Entiat, Wash., relate to various phases of fish culture, and best types of apparatus, pond construction, and other matters pertaining to the physical, biological, and chemical end of fish rearing.

At three other laboratories—Convict Creek, Calif., Logan, Utah, and in the Great Smoky-Shenandoah National Park area—the studies pertain to stream and other water conditions and their effect on trout, especially hatchery-raised trout. In addition, there is the project designed to rid the Great Lakes of the sea lamprey.



Trout hatchery, Hagerman, Idaho

The propagation of warm-water fish also has its problems, although they are quite different from the problems that affect the rearing of trout and salmon. This is mainly because warm-water species are usually placed in earthen ponds to propagate naturally, while trout and salmon are spawned artificially, and warm-water fish are reared in water temperatures that are much higher than the maximum required for trout and salmon. In recent years, more attention is being given to the growth and survival problems of the various types of warm-water fish.

Nutritional studies are important because the food item is a considerable part of the cost of propagating fish and because improper feeding can cause heavy losses in hatchery fish and retard the development the fish need to combat the rigors of life in natural waters.

In the development of practical diets, vitamin needs, the effect of diets upon body tissue, the effect of metabolic products on the carrying capacity of ponds are

among the things studied. Results include getting much more poundage per unit of cost and time and more success in transferring fish from the hatchery to the distant streams.

Numerous studies are being made on fish diseases due, probably, to virus and bacteria. Determining the cause and cure of various infections which have occurred in rainbow trout hatcheries is one objective.

At the salmon cultural station, work is being done on the development of hatchery techniques, improvement of incubation equipment, effects of temperature changes, feeding trials, methods of maturing salmon, electrical diversion of fish into fishways and away from power and irrigation outlets, proper construction of ponds to assure maximum fish production, and numerous other problems.

The field investigations being done in California, Utah, and in the Great Smoky-Shenandoah area cover two general fields. One is a series of studies of the adaptations which a hatchery fish must make to fit into natural stream and high mountain lake environment. The other concerns various things which affect naturally-produced trout in their native waters.

California

LOGGING AND FISHERIES COOPERATE IN ELIMINATION OF SALMON STREAM DAMAGE: Timber operators, owners, and loggers have been called upon by the Department of Fish and Game to cooperate in the elimination of stream damage which is harming silver salmon and steelhead fisheries in California's north coast area, that Department's May 1956 Outdoor California periodical reports.

A series of three bulletins titled "Fish News for Timber Operators and Fishermen" are being mailed to approximately 2,000 operators, owners, and loggers to familiarize all segments of the logging industry with problems such operations pose on salmon and steelhead streams.

In a letter to leaders of the industry, the Department Director said: "We are hopeful that if various segments of the logging industry become familiar with these problems they will cooperate with us in attempting to eliminate the problems for the future welfare of these valuable wildlife resources."

The bulletins point out that siltation and blocking of streams resulting from logging operations are the principal factors harmful to fish. At the same time it is pointed out that there is no reason why salmon, steelhead, and logging can't get along together without too much difficulty.

In pointing up the problems as seen by the department, the bulletins describe the various factors which affect the fish, particularly in relation to their spawning habits and needs.

Excerpts from the bulletins follow:

> "The value of lumber and the lumber industry to the north coast area, of course, is great. The annual value of the salmon and steelhead is less than that of lumber. But the value of each is important to the welfare of California's economy and her people. It need not be a choice between the two, for both can exist without serious conflict. Some loggers today are getting their logs out economically and at the same time are protecting

the streams for salmon and steelhead. Many others could also help with minor changes in their planning and operations."

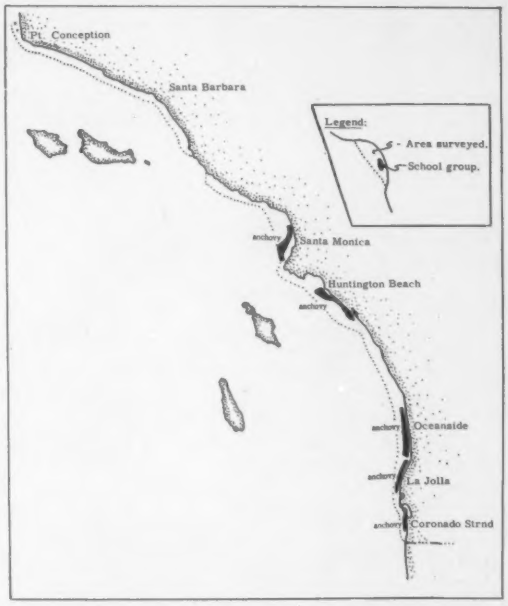
The bulletins further point out that the department has legal responsibility for the welfare of the fish, but seeks to obtain cooperative efforts from loggers in preventing damage to the streams, rather than to prosecute violations after the damage has been done.

* * * * *

PELAGIC FISH DISTRIBUTION AND BEHAVIOR STUDY CONTINUED (Airplane Spotting Flight 56-3): The inshore area from San Francisco to San Diego was studied from the air by the California Department of Fish and Game Cessna "170" (1359D) April 2-6, 1956. This was the third of a series of periodic flights designed to study pelagic fish distribution, abundance, and behavior in 1956.

No schools of fish were sighted in the Central California area (San Francisco to Pt. Conception) during this flight. It is known, however, that schools of anchovies were present in Monterey Bay and it is believed that heavy seas stirred up by strong northwest winds drove the fish to depths below the limit of visibility from the air. Another factor contributing to poor visibility into the water was the presence of very rich "brown" (dyanoflagellate) water along the Central California coastline.

Of particular interest was the presence of hundreds of "swarms" of euphausiids in the Monterey Bay region. These swarms ranged from 5 to 40 feet in diameter and appeared at the surface where they were preyed upon by thousands of gulls. The sport salmon boats were working in the areas of the bay where these swarms were found, indicating that the salmon were also concentrated in these areas, possibly to feed upon the euphausiids.



Airplane Spotting Flight 56-3, April 2-6, 1956.

"Green" (diatom) and "blue" (oceanic) waters occupied the inshore area of southern California with occasional reddish-brown (dyanoflagellate) "blooms" present in the Newport and Pt. Vicente areas.

Species identification of fish schools was possible through a combination of observation from the air and interviews of commercial fishermen working in areas where fish were spotted. Night fishermen could find no anchovies in the Huntington Beach area but in the daytime commercial airplane spotters found large schools. Conversely, night fishermen found jack mackerel schools in this same area at night but fishermen and planes working at day-

Region	No. Schools	Total Area (Sq. Ft.) in Region
Coronado Strand.	62	33,000
La Jolla	32	108,000
Oceanside	118	248,000
Huntington Beach	48	62,000
Santa Monica . .	65	187,000
Total	325	638,000

time found but a few small schools of jack mackerel. All schools seen on this flight were tentatively identified as anchovies.

No schools were seen which contained sardines, and likewise no sardines were taken by commercial fishermen during this period.

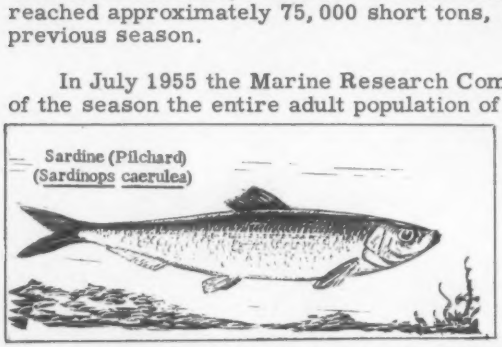
Anchovy: A count of the number of schools and an approximation of the area of each school was made. The results are found in the table.

There was a decided increase in the numbers of anchovies in the San Diego and Santa Monica areas since the March flight. The schools off Huntington Beach and Oceanside remained in about the same number and size.

* * * * *

PRESEASON 1955/56 PACIFIC SARDINE PREDICTION CONFIRMED: When the California 1955/56 Pacific sardine season ended February 1, the catch had reached approximately 75,000 short tons, or only about 7,000 tons more than the previous season.

In July 1955 the Marine Research Committee reported that prior to the start of the season the entire adult population of the Pacific sardine was in the neighborhood of 600,000 tons, that approximately 300,000 tons of adult fish were in California waters, and that 150,000 tons might be taken if economic conditions did not curtail the fleet's efforts.



This, the Committee report stated, was about the same amount of fish as was available to the fishery in the 1954/55, season which was hampered by labor disputes at the beginning of the season and unfavorable market conditions which kept the vessels on limits. This resulted in holding the catch to 67,000 tons.

The 1955/56 season also had a delayed start because of labor disputes which at first kept the catch below that of the previous season. However, since the vessels were not greatly hampered by limits, they exceeded last season's landings by mid-season, and finished with a slightly higher total catch.

Season Highlights: Several interesting aspects of the season are apparent:

1. Although the canneries were accepting fish and the infrequent imposition of limits had little effect on the size of the individual boat catches, the fishermen's success declined markedly as the season progressed.

2. About 50 percent of the commercial catch by number was of fish born in 1952.

3. Evidence to date indicates that the spawn success since 1952 has been poorer than in 1952, which was considered weak.

4. According to the Marine Research Committee preseason report, the adult sardine population was smaller preceding the 1955/56 season than it was before the 1954/55 season, but that a higher percentage (about 50 percent) was off California in 1955/56.

5. The evidence at hand indicates that the sardines off Southern California the past two years were chiefly fish which had been born off Lower California.

Outlook for Future: From the foregoing it would seem that the sardine population is still at a low level and that unless favorable conditions allowed for a good spawn survival the outlook for the industry is not good.

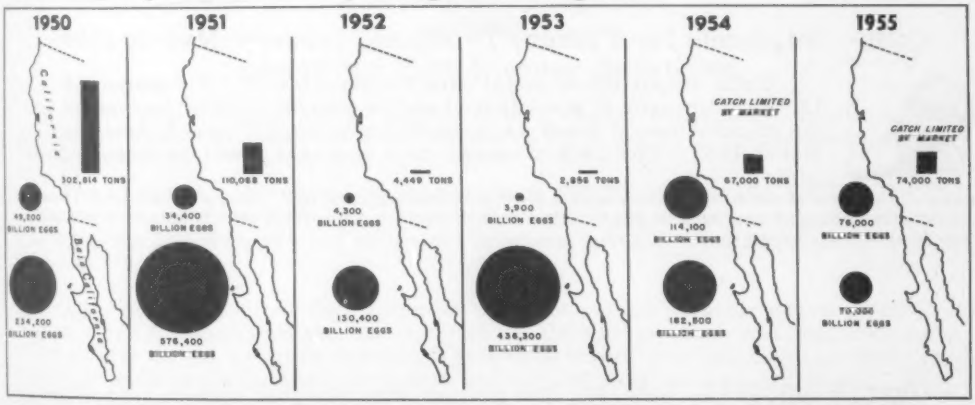
Of course, a higher percentage of sardines could possibly move in from Mexico and yield an increased catch, but without the favorable recruitment of young fish this would only result in a further decline in the total population.

There are a number of hypotheses regarding reasons for the poor recruitment of recent years. Two are discussed in the recent Marine Research Committee publication "Progress Report, California Cooperative Oceanic Fisheries Investigations, 1 July 1953--31 March 1955." The two hypotheses discussed are: (1) total survival of sardines from spawning is not dependent upon brood stock size except at stock levels lower than any yet experienced in the sardine population; and (2) above and below certain population levels the survival of sardines from spawning depends on the size of the brood stock, and these critical levels have occurred in the history of the sardine fishery. The effect of the brood stock size on recruitment definitely needs further study.

This paper is a departure from former Marine Research Committee reports since this is the first time that a technical discussion of fishery dynamics has been included.

* * * * *

SARDINE CATCH FOR 1956/57 MAY BE LOWER: Catches of California's once great sardine fishery may be lower next season, as the total sardine population continues to decline, the State's Marine Research Committee was told recently by fisheries investigators of five cooperating research agencies.



Comparison of Pacific sardine spawning and California catch, 1950 through 1955 (Source - U. S. Fish and Wildlife Service).

The Committee, which coordinates and helps finance a Statewide research program, met in San Francisco to hear the scientists' report and pass on division of its $100,000 budget among the five agencies.

The sardine catch for the season just ended totaled 74,000 short tons, up about 7,000 tons from the previous season. Economic factors held the catch somewhat below what the resource could have provided, the researchers pointed out, according to a March 30 release from the California Department of Fish and Game.

Agencies cooperating in the program include the California Academy of Sciences, California State Department of Fish and Game, Stanford University's Hopkins Ma-

rine Station, University of California's Scripps Institute of Oceanography, and the U. S. Fish and Wildlife Service.

* * * * *

WHALING INDUSTRY REACTIVATED: The catching and rendering of whales, formerly conducted at Fields Landing, Calif., has been reactivated by the establishment of the two land stations at Point San Pablo, Richmond (near San Francisco), and the licensing of two catcher boats. The whale catchers are the M/V Dennis Gayle and the M/V Donna Mae. The Dennis Gayle formerly operated out of the Fields Landing station.

The catcher boats and the land stations expect to catch and process from one to four whales a day during the whaling season. The first catch, made on May 9, was a 36-ton humpback whale. In addition to utilizing the whales for meal and oil, it is believed that suitable parts of the whale meat will be chopped and frozen for mink or other animal food. This venture is the first attempt to catch and process whales in the United States since 1953.

As whales are plentiful in the offshore waters of California during the summer months, it is possible that another shore plant will be established at Morro Bay in Southern California.

For catchers attached to land stations, the open season for baleen (blue, fin, humpback, sei, or minke) whales is May 1-October 31 and for sperm whales April 1-November 30.

Cans--Shipments for Fishery Products, January-March 1956

Total shipments of metal cans January-March 1956 amounted to 16,560 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 15,237 tons in January-March 1955. The pack of canned tuna was heavy over the three-month period.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

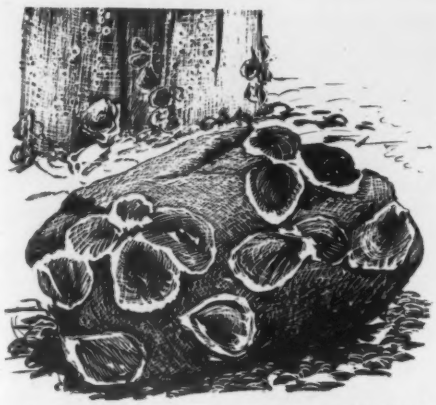
Delaware

OYSTER INDUSTRY, 1954/55: The amount of marketable oysters harvested in Delaware July 1, 1954-June 30, 1955, dropped because hurricane "Hazel" inflicted considerable damage to the oyster beds, the Annual Report of the Delaware Commission of Shell Fisheries points out.

Also, during the summer months of 1954 there was an even greater death toll in marketable oysters, but the cause was unknown.

The natural seed beds of Delaware did not catch a natural growth during the year and seed in Delaware Bay was very scarce. Approximately 18,000 bushels of seed oysters were taken from the natural beds in the Delaware Bay. Only 14 oyster boats worked on the natural oyster beds in the Bay. The Commission restricted part of the natural rocks in Delaware Bay and did not allow the oyster boats to work in that area.

A total of 40,000 bushels of shells was planted on the natural rocks in Delaware Bay. Also, shells were planted in the Murderkill River, Leipsic River, and Simons Creek. Approximately 150,000 bushels of seed oysters were tonged from the rivers in Delaware and sold to the Delaware oyster planters for the purpose of planting on leased oyster bottoms. Also, about 300,000 bushels of seed oysters were bought by the Delaware oyster planters for their leased bottoms. Most of these seed oysters came from Virginia.



Oyster spat (magnified many times) on small pebble.

About 60,000 bushels of seed oysters were planted in the Rehoboth and Indian River Bays. About 45,000 bushels of marketable oysters were taken from these two Bays.

Delaware has a large frozen sea-food plant which has expanded extensively during the year under review. During that period (July 1, 1954-June 30, 1955) the oyster products packed by all Delaware plants consisted of 4 million cans of oyster stew; about 600,000 pounds of frozen canned oysters; around 100,000 pounds of breaded frying oysters; and 300,000 gallons of fresh shucked oysters. The oyster industry in Delaware has close to 3,000 employees.

The value of the oyster industry in Delaware is currently estimated at $5 million. The oyster industry is one of the largest natural resources of the State of Delaware.

Electronic Fish Counter Developed

An electronic fish counter designed to help answer some of the questions biologists have about fish was demonstrated March 13 at the U. S. Department of the Interior building at Portland, Ore.

The device was developed by the Service's Pacific Salmon Investigations fish-counting laboratory at Seattle. Although the instrument was demonstrated on laboratory scale it has been tried out on the practical level at the Billard Locks of Lake Washington.

The basic element of the equipment is an electronic detector which gives a signal when a fish is between its electrodes. By suitable choice of electrode elements, size and sometimes species of fish may be differentiated and accurate records of passing fish made. Direction and time of passage also are shown. The electrodes are normally installed in tunnels through which the fish must pass.

The device does not use photoelectric methods, hence rocks and water-logged vegetable matter are not falsely counted, and water turbidity offers no problem. The system will work at any depth and in murky water where visual observation is impossible.

The detector utilizes the difference of conductivity between fish and water. By connecting the detectors to a third unit, a logic device, the direction of complete passages may be separately recorded while incomplete passage is ignored.

The detector may also be used as an alarm device to aid in visual counting, alerting the personnel at the counting board, thus giving them greater freedom be-

tween periods of light run. Operation is possible either from batteries or power lines. The high-frequency electric field between the electrodes is less than one-third of a volt in amplitude, well below the threshold of sensitivity of fish.

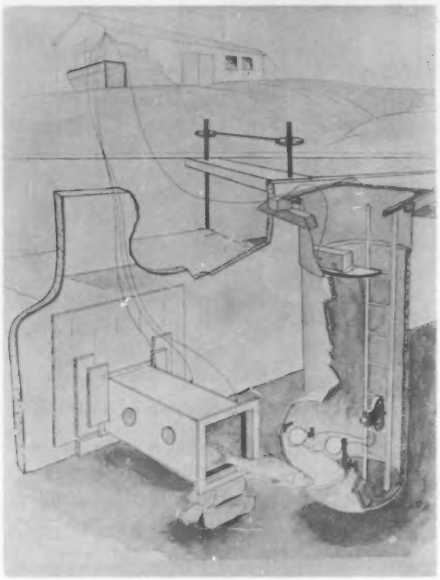


Diagram of an electronic fish counter.

The basic detector circuit was developed and is to be used as a triggering device for a split-field camera which will photograph fish allowing identification of tag numbers, species, net marks, etc. The potential of the detector as a research and management tool appeared so great, however, that primary emphasis was placed on securing its early commercial availability at a reasonable price without maintenance worries.

The detector may be used with troughs, some crested weirs, posts in stream beds, etc., where tunnels are not desirable. Tunnels are available in transparent, opaque, and pigmented materials to suit a particular installation.

The U. S. Army Corps of Engineers has purchased a multiple-bank counter for installation at its fish orientation laboratory at Bonneville. This counter has electrodes connected to a honeycomb of tunnels for counting large numbers of fish in the stream.

Exploratory Vessels Find New Shrimp and Yellowfin Tuna Areas

New fishing waters for small cocktail-size shrimp off the State of Washington and the locations of concentrations of yellowfin tuna in the southern part of the Gulf of Mexico were made recently by the exploratory fishing vessels of the U. S. Fish and Wildlife Service.

Prior to the recent development in the Gulf, yellowfin tuna was not known to be available in the Gulf of Mexico during the period from January to May, the time of their disappearance from the northern waters of that area. The discovery may lead to a year-round tuna fishery. The find was made by the exploratory fishing vessel Oregon in the offshore waters of the Gulf of Campeche.

The exploratory work on the shrimp was done by the Service's exploratory fishing vessel John N. Cobb. Previously small shrimp had been found in commercial quantities in the waters off Oregon and California. Work done during the fall of 1955 indicated that there were extensive shrimp beds from Cape Disappointment to Destruction Island, Wash., principally in waters between 50 and 100 fathoms deep. On its April exploratory cruise the John N. Cobb discovered what might become an excellent shrimp fishery off the Gray's Harbor area.

During the test, the Gray's Harbor area yielded shrimp at the rate of 2,000 pounds per hour for the best catches. Fairly consistent catches of 500 pounds an hour are reported. One day seven 30-minute drags made during the morning re-

sulted in 5,210 pounds of shrimp. Random samples showed that the shrimp ranged from 110 to 122 per pound.

One commercial shrimp vessel has begun operations in the area.

Fish and Wildlife Service officials feel that the discovery of the shrimp grounds off Washington will be an important addition to the local fishing industry.

Note: Also see Commercial Fisheries Review, June 1956, pp. 25 and 31.

Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPARTMENT OF DEFENSE, APRIL 1956: A total of 1.8 million pounds (valued at $0.8 million) of fresh and frozen fishery products were purchased during April 1956 by the Army Quartermaster Corps for the use of the Army, Navy, Marine Corps, and Air Force. This was 16.6 percent less in quantity and 24.8 percent less in value than purchases in March 1956. Compared with April 1955, the purchases this April dropped about 18.2 percent in quantity and 12.8 percent in value.

Purchases of Fresh and Frozen Fishery Products by Department of Defense (April and the First Four Months, 1956 and 1955)

QUANTITY				VALUE			
April		Jan.-April		April		Jan.-April	
1956	1955	1956	1955	1956	1955	1956	1955
(1,000 Lbs.)				($1,000)			
1,835	2,242	6,778	8,686	832	953	3,533	3,718

Prices paid for these products by the Department of Defense in April 1956 averaged about 45.3 cents a pound as compared with 50.3 cents in March 1956 and 42.5 cents a pound in April 1955.

During the first four months of 1956 purchases totaled 6.8 million pounds (value $3.5 million)--lower by 22.0 percent in quantity and 5.0 percent in value than for the first four months in 1955.

In addition to purchases of fresh and frozen fishery products indicated above, the Armed Forces generally make some local purchases which are not included in the above figures.

CANNED FISHERY PRODUCTS PURCHASED THROUGH MARKET CENTERS, JANUARY-MARCH 1956: Canned tuna, salmon, and some sardines were the principal canned fishery products purchased for the use of the U. S. Army, Navy, Marine Corps, and Air Force by the Army Quartermaster Corps through its Market Centers during the first quarter of 1956. Purchases amounted to 1,396,000 pounds of canned tuna, 601,000 pounds of canned salmon, and 8,000 pounds of sardines.

It is believed that only a portion of the requirements for canned sardines are represented in the data given since some canned sardines and canned fishery products other than tuna and salmon are procured locally and no information is available on these local purchases. Therefore, actual purchases of canned fishery products are higher than indicated in the data given.

* * * * *

QUARTERMASTER CORPS RESEARCH EMPHASIZES NEW LIGHTWEIGHT FOODS: In order to adapt military subsistence to the modern defense strategy of extreme dispersal, the Army Quartermaster Corps is seeking to develop dehydrated and concentrated foods and irradiated foods.

Maj. Gen. K. L. Hastings, The Quartermaster General of the Army, described the food picture of the future in a speech April 11 before the 10th anniversary meeting of the Research and Development Associates.

He said that for research and development men the big question is, "How will the strategic and tactical requirements of the future affect the military subsistence picture?" General Hastings answered this question as follows:

"A complete answer to this question lies only in the realm of prophecy. However, there are already a few basic principles which are becoming fairly obvious. The outlines of streamlined supply systems for a possible future all-out war are taking shape. Weapons research and development in recent years have catalyzed modes of logistical thinking. As before in conventional wars, enemy strategy in future atomic warfare on land will be directed toward finding the most profitable targets. Defense strategy will be directed to eliminate these profitable targets--including avoidance of massed forces of men engaged in combat or in support operations such as food distribution, food preparation, and related activities.

"It is here that the food picture of the future begins to take shape. We must accommodate our rations and our feeding systems to the new doctrine of extreme dispersal. To do this we must reduce food tonnage, simplify the lines of supply over which food must travel, and eliminate to the extent possible all vast food storage and food preparation centers that in the very nature of things require a massing of support forces, and therefore a profitable target.

"Fortunately, conventional warfare has long been concerned with this objective of reducing food tonnage. Palatable concentrates and dehydrates are presently available to us in sufficient variety to compose an adequate meal. You are perhaps aware of the fact that dehydrated orange juice, green beans, fish sticks, and soluble coffee, potatoes, eggs, and other items have been brought to a high state of acceptability. Many other items have been substantially improved under the Quartermaster research and development program on dehydrated products. I have tried these items at various times and I can say that they compare most favorably with other forms of preserved food.

"Inspired by the requirements of possible atomic warfare, we are at work on dehydrated foods that will lend themselves to a completely dehydrated precooked meal. New items in addition to those that have shown themselves to be satisfactory will be required. Prospects for success are good--a compliment to the energy that has been devoted to attaining new and greatly improved techniques of drying. If we assume the desired reduction in food tonnage is 50 percent--a percentage that has been suggested--we already have exceeded that percentage in the instance of many dehydrated and concentrated foods--and I mean palatable, nutritious, readily reconstituted dehydrated foods. In some foods, the weight reduction achieved runs as high as 80 percent.

"Besides reducing tonnage, we must simplify the lines of food supply. The far-ranging nuclear ships of the Navy, the long-distance bombers of the Air Force, and the fast-moving troops of the Army must be free of bulky and heavy paraphernalia. Our subsistence planning must be geared to the realization that in any future all-out war the equipment, as well as the labor, required to store and issue food must be kept to the barest possible minimum. One of the ways we hope to achieve this is through our current food irradiation program. In fact we have already demonstrated, theoretically at least, that irradiation preservation will permit a tremendous reduction of facilities required for proper storage of food.

"There is another potential benefit of irradiation I would like to mention. If we increase the burden on industry by requiring more highly-processed concentrated foods for use in combat areas, we must decrease to the extent possible the time, labor, and effort needed to provide food for noncombat areas. This probably means a greater dependence in noncombat areas upon fresh market produce. And it is in preserving and extending the storage life of fresh foods that our program of irradiation preservation of food has been particularly successful.

"The prospects for the widespread military use of foods preserved by irradiation are excellent. The current emphasis on the benefits of irradiation as a 'pasteurization' technique does not mean that we have sidetracked our interest in the possibilities of irradiation for long-term preservation. Investigations are continuing in this phase of the program, and we are definitely gaining ground.

"As I have said, we must reduce our subsistence handling and storage operations to the absolute minimum. We must find the lowest common denominator of both facilities and functions required to supply and feed this dispersed, flexible, mobile fighting force of the future. . . ."

Florida

FISHERIES RESEARCH, OCTOBER-DECEMBER 1955: The following are some excerpts from the Quarterly Report on Fisheries Research, December 1955, of The Marine Laboratory of the University of Miami.

Mullet Fish Sticks: The last taste tests were run on the mullet fish sticks. Briefly, fish sticks made of mullet were acceptable to many testers, but more people expressed a preference for cod or haddock sticks than for mullet sticks. The high fat content of mullet sticks will make it necessary to hold them for only comparatively short periods of time in frozen storage.

Shrimp Technology: ANTIBIOTIC ICES: With the work of the past quarter included, seven series of experiments have now been completed testing the effect of antibiotics on shrimp freshness. The latest experiments have tested aureomycin and terramycin frozen in ice, according to the new methods developed last year. As in the case of the dips, the antibiotic ices show definite improvement of quality of shrimp, in terms of bacterial counts and organoleptic criteria. The excessive formation of black spot remains a problem. In attempts to avoid this, four different ions were used in place of calcium (manganese, magnesium, cobalt and nickel), but with no success. Ice has now been made up, for use in the January experiments, avoiding the use of bivalent ions, and substituting methylcellulose and carboxy methylcellulose for the alginate carrier.

BLACK SPOT CONTROL: Another chemical has been tested as a possible control for black spot. This is butylated hydroxytoluene (Ionol), a powerful antioxidant. Results were negative in the first test, but this may be due to the uneven distribution of the chemical through the ice block. The technique for distributing Ionol has been altered and the experiment will be repeated.

Commercial ice manufacture involves bubbling air through the water to be frozen. This produces a clear block, but may add enough oxygen to encourage black spot. Tests were run some months ago with ice made without the air being bubbled through it. Further work is being done on this, and results have been encouraging enough to cause some shrimp boats to use the new type ice.

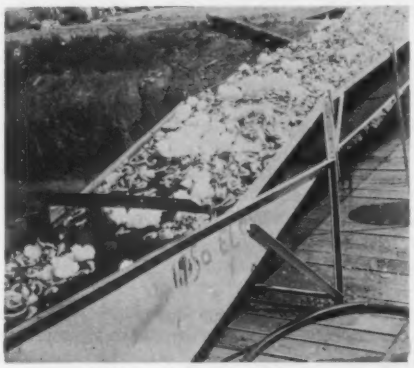
The effectiveness of dipping newly-caught shrimp in dilute solutions of sodium bisulfite was established earlier as a black-spot control. Latest work has been to establish the amount of this chemical which remains in the muscle of shrimp dipped in the solution, and to measure the destruction of thiamine. The SO_2--equivalent residual of the bisulfite has proven to be encouragingly low, in the order of 30 to 45 parts per million in both raw and cooked shrimp. This is compared to about 3,000 ppm. in dried apricots, about 1,800 ppm. in dried apples and about 1,200 in raisins. Thiamine destruction appears to be slight, which is also very encouraging.

Investigation is also under way on occasional lots of bisulfite--treated shrimp which turn yellowish or brownish. This may be associated with overexposure in the dip solution.

FRESHNESS TESTS: A final series of indole determinations were run in continuing attempts to find a satisfactory chemical test for freshness of shrimp. This was the follow-up of the report made in November, suggesting that the simultaneous operation of three sets of apparatus, with a larger number of shrimp being used for the samples, might improve the consistency of results. This expectation was borne out and indole is thought to be useful as a laboratory test for shrimp freshness.

Small Shrimp Survey: During the last quarter of 1955, four trips were made out of Key West in connection with the small shrimp study. Four of these were charter trips and the fourth one a shrimp boat pursuing its regular commercial-fishing operations.

Hauls were made on grounds expected to yield small shrimp. A standard shrimp trawl was used, except that the cod end was of smaller mesh than in general use, being of $1\frac{1}{4}$-inch stretched mesh. In order to catch shrimp and fish which escape through the cod end, a cover bag of one inch stretched mesh was attached to the cod end. All three charter trips during the quarter used this mesh and gear arrangement. Altogether 23 hauls were made.



Unloading a commercial shrimp vessel with a conveyor system.

The amount of shrimp caught in each haul was recorded, as well as the amount and general composition of the trash. The amount of shrimp retained by the cod end and those caught in the cover net were recorded, and measurements made of the sizes of the individuals. Identification has been made of the fish making up the trash. Of interest is a small shrimp caught in the cover bag, of a different species from the commercial shrimp. The small species is Trachypenaeus constrictus. At present few, if any, are caught in commercial gears, but this unused shrimp is as big as some now used, especially in the canning and drying trade.

Blue Crab: This program has been concerned with the problem of helping Florida crab producers retain markets, particularly in the north, in the

Great Lakes Fishery Investigations

CHUB FISHERY NOT RESPONSIBLE FOR DECLINE OF LAKE MICHIGAN TROUT: The decline of Lake Michigan's trout fishery, which plunged from an annual catch of 6,500,000 pounds in 1946 to a mere 34 pounds in 1955, is due to the sea lamprey rather than to destruction of young lake trout by the chub fishery or to failure of natural reproduction, a study made by the Fish and Wildlife Service indicates. The study was made by Paul H. Eschmeyer, biologist for the Service. Overfishing as a reason for the decline was ruled out by earlier studies.

To further emphasize the decrease of lake trout in Lake Michigan, the research shows that in the first seven months of 1954 gill-net settings totaling 8,794,000 feet (or 1,666 miles) brought up only 326 trout and that in a four-months period in 1955 more than 1,400 miles of net caught only 8 trout.

The three possible reasons for the decline--(1) the destruction of young trout by the use of small-mesh nets by the chub fishermen, (2) the near or complete failure of natural reproduction, and (3) the sea lamprey--are discussed in turn.

The heavy loss of young lake trout through chub fishing activities had no adverse effect upon trout abundance, according to the report. During the period, 1935 to 1939, the number of small trout destroyed by chub fishing varied from 688,000 to 927,000. If such destruction had been detrimental to the abundance of trout, a serious decline in that abundance could have been expected during the 1939-1944 period. Yet during these years the abundance index varied from 100 percent to 126 percent. This index is based upon the 1929-1944 average. Conversely, in 1940-1944 chub fishing was less intense and destruction of trout was correspondingly lower. But just when the trout fishery should have benefitted by the decreased destruction, the fishery collapsed completely in the later 1940's.

Studies also showed that failure of natural reproduction first exerted a major influence in 1954, and that the enormous decline in abundance occurred well in advance of the time when failure of natural reproduction could have been a factor.

A study of the correlation between the size of lake trout and the percentage of individuals bearing sea lamprey scars and other studies in the field of lamprey depredations, plus the ruling out of the other possible causes, leads to the conclusion that the Lake Michigan trout have been brought to near extinction by the lethal attack of the sea lamprey.

The sea lamprey was noted in Lake Michigan as early as 1937. By 1946 it was spawning in great numbers in many streams tributary to Lake Michigan. Fish and Wildlife Service biologists who have been working on selective poisons and other methods of controlling the sea lamprey report considerable progress in their efforts.

* * * * *

OPERATIONAL PLANS FOR SERVICE'S RESEARCH VESSEL "CISCO" FOR 1956: During the 1956 operational season of the U. S. Fish and Wildlife Service research vessel Cisco, a comprehensive survey will be made of the Saginaw Bay area of Lake Huron.

The objectives of the survey will be to study the species of fish inhabiting Saginaw Bay, their distribution, and relative abundance. In addition:

1. Determine the seasonal movements and summer distribution of the walleye and lake herring.

2. Measure and otherwise evaluate the physical or biological factors that may have contributed to changes in the composition of the Saginaw Bay fish population that have occurred in recent years.

3. Determine the conditions required for natural reproduction of important species of the Bay and factors that may influence the success of spawning, incubation, hatching, and juvenile growth.

4. Establish the occurrence and distribution of larval, fry, and yearling stages of species that may be important in influencing the status and structure of the fish population.

Cisco, research vessel of the Service's Great Lakes Fishery Investigations.

5. Establish measures that may be used as a base to follow future changes of the physical and biological conditions in Saginaw Bay.

6. Describe the current systems in Saginaw Bay and the adjacent portion of Lake Huron, and determine the amount of interchange between the bay and lake.

In the course of the survey, gill nets, otter trawls, and other nets will be used to sample the population (both adult and larval) of the Bay. All walleyes or yellow pike taken alive and in good condition will be tagged and released. Several types of tags will be tested for effectiveness. Additional scientific data will be collected for population studies; stomach contents and fish-food organisms; environmental factors such as water temperatures, water turbidity, chemical composition, and condition of the bottom; drift bottles will be released at regular stations along the route of the cruises; and routine plankton collection made at all hydrographic stations.

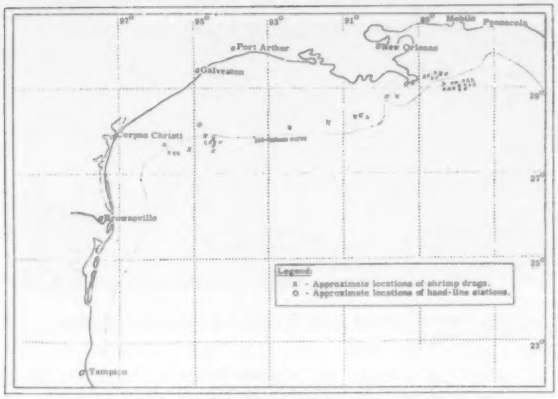
Gulf Exploratory Fishery Program

RED SHRIMP CAUGHT IN GULF OF MEXICO BY "OREGON" (Cruise 38): Large red shrimp (Hymenopenaeus robustus) were taken in all drags beyond the 200-fathom curve by the M/V Oregon during a three-week exploratory shrimp-trawling cruise in the northwestern and north-central Gulf of Mexico. A total of 41 drags and two hand-line stations were completed during the trip which ended on May 22. A total of 28 drags were made in depths of 100 to 300 fathoms and 13 in 30 to 60 fathoms.

Using 80-foot balloon and 100-foot flat trawls, catches ran from 90 to 210 pounds per three-hour drag in the area east of the Mississippi Delta as compared to catches of 5 to 30 pounds off the Texas coast. Catches in the 200- to 240-fathom range also included from 10 to 100 pounds of 50-count Penaeopsis megalops, a smaller deep-water shrimp. Catches of 300 to 500 pounds of scrap fish were common in both areas. Hake and whiting accounted for the bulk of the catch.

Catches of brown-grooved shrimp (Penaeus aztecus) ran from 2 to 22 pounds per hour using a 40-foot flat trawl at the 13 shallower-water stations. Following up reports of a "new" species of shrimp entering the fishery in the Mississippi Delta area, a series of six drags were made in 30 to 60 fathoms off Pass a Loutre.

Small numbers (from ½ to 3 pounds) of 31-35 count "humpback" shrimp (Solenocera vioscai) were found mixed with the brown-grooved shrimp in the 30- to 45-fathom drags. This species has been commonly taken in very small numbers in commercial catches off the Mississippi Delta area.



M/V Oregon (Cruise 38).

Severe gear losses due to bogging were encountered in the deep-water dragging, particularly in the northwestern Gulf. During the cruise three complete rigs were lost including bridle, doors, and trawl. Five additional rigs were badly damaged.

During the trip an uncharted rock "ridge" was found, originating in the vicinity of 27°57' north latitude, 94°55' west longitude, and extending several miles in an east-southeasterly direction. Echo-recorder tracings showed good indications of bottom fish along the entire ridge. On May 8 a series of hand-line stations at various points along its length yielded approximately 1,600 pounds of red snapper and 300 pounds of several species of groupers.

Maryland

OYSTER PROSPECTS BRIGHT ON SOME MARYLAND BARS: Lack of sufficient oyster set is one of the chief limiting factors in oyster production on many bars in the Chesapeake area. Certain oyster beds are known for the production of fat well-shaped oysters but seldom receive enough spat on them to replace the oyster populations as rapidly as the crops are harvested. These bars will usually yield only meagre crops that are far below their full capacity unless adequate supplies of young oysters can be introduced as seed. To a limited extent the State has been able to stimulate yields on such bars by planting seed, but this is expensive and available public funds are used primarily for planting shells where spat are likely to attach. Even if all such funds were used for planting seed on low-setting bars, only a small fraction of their potentially-productive areas could be planted. Thus the crop on unplanted bars may almost reach the vanishing point when setting fails over a long period of years. This has been the case on many good oyster-growing bottoms of the State where a marked reduction in yield has occurred.

Examinations of oyster bars early in 1956 in the Patuxent River have shown that the best sets for many years occurred during 1954 and 1955 on bars all the way up to the head of the oyster-producing area, a relatively short distance above the Patuxent River Bridge. Reports indicate that a similar condition exists on the upper Severn River bars and in parts of the South River area. Increased sets also occurred on the Eastern Shore side of the upper Bay. In the Patuxent, counts of about 200 per bushel of the 1954 set on natural cultch were found in the upper river together with a scattering of 1955 set. The 1954 set decreased gradually downstream although counts of over 100 per bushel were found on some bars in the middle section, ranging down to an average of approximately 50 per bushel in the lower river. The 1955 set was highest in the lower river except near the mouth and ranged up to around 200 per bushel. State shell plantings in the lower half of the River also received good catches, in one sample as high as 442 spat per bushel on 1955 shell. The set was not uniform but was quite general.

Counts made in the Patuxent during a period of more than ten years prior to 1954 have shown an average of less than 10 spat per bushel per year on natural cultch. On the other hand, the count for a good seed-producing area, such as St. Mary's River, often is 1,000 or more spat per bushel. Survival of spat in the Patuxent River has been quite good in the past. Hence it is expected that the marked increase in the quantity of spat now present on available cultch should be followed by a period of increased production from the River's natural rocks. It should be pointed out, however, that the extent of the set is limited by the available cultch and that cultch has become progressively scarcer as shell and cinder become covered by silt on depleted bars.

The set for 1954 and 1955 was something less than average over most other oyster bars in Maryland, especially in the lower or saltier oyster-producing areas. These years were both exceptionally dry, up to the August storms of 1955. The drought condition resulted in the salinity of the water at Solomons averaging about 25 percent above normal during the oyster-spawning season of the two years. Less detailed observations indicate that a similar rise in salinity occurred over most of the Chesapeake. This probably was even more marked in the uppermost oyster-producing areas where salinities usually are kept down by the flow of fresh water downstream.

A tentative theory of how this condition may have brought about the observed increased set follows: Tidal action in an estuary tends to move saltier water upstream near the bottom and this, when accompanied by a lessened dilution with fresh water during dry seasons, may have tended to concentrate more larvae than usual in the upper reaches of the River. Activity of oysters and the presence of tiny marine organisms upon which oysters and oyster larvae feed would also be affected by the rise in salinity. Resultant changes of this nature may have favored better production and survival of larvae and spat. The exact mechanism by which the better sets were brought about is not understood, however, and the association with the conditions caused by dry weather may be only a coincidence. Continued studies of the factors that influence oyster spawning and setting will be made and certainly any future occurrence of exceptionally dry years will be noted carefully in relation to the oyster setting pattern, according to the March 1956 Maryland Tidewater News of the Maryland Department of Research and Education.

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SUSPENDED CULTCH FOR OYSTER SET TESTED IN CHINCOTEAGUE BAY: Experiments which were designed to test several methods of holding cultch for oyster set above the bottom have been tried this past season in Chincoteague Bay, Md. Results indicate that due to the high cost and scarcity of seed oysters it may be economically feasible to grow seed oysters above the bottom where enemies cannot gain access to them. This should insure better survival and higher quality in the seed oysters and so justify the cost of the operation. In the past the cost of seed oysters was low and the quantity was sufficient to meet the demand. Any method of producing seed which involved high labor costs was economically out of the question. In other countries where labor is cheaper similar methods have been used for many years with good results, the March 1956 issue of Maryland Tidewater News of the Department of Research and Education points out.

The shells which were used as cultch in Chincoteague Bay were put on metal trays or held in wire bags and placed so that they would be in the intertidal zone. Tidal amplitude averages about one foot in that part of the Bay. The results of this experiment indicate that the method could be successful commercially as far as receiving a set of oysters is concerned. The operation, however, was on too small a scale to obtain any cost data. The shells held in the wire bags or trays retained a set of oyster spat which was about sixteen times as great as that on the shells which were planted on the bottom directly beneath the suspended shells. This was tested in two areas of the Bay and the figure given is the lowest set obtained.

Several factors may contribute to the success of the suspended cultch, but certainly the fact that they were divorced from nearly all of their enemies is very important. Another important consideration is that none of the shells were in the mud. Both sides of the shells were available to receive the set of oysters. Another important point is that this method may be used to utilize good setting areas which may have a very soft muddy bottom which would not support shells planted there. Many potentially-good setting areas are not now being used for the above-mentioned reason.

The investigation will be carried on during the 1956 season. The costs will be noted so that an accurate estimate of the per bushel cost of seed raised in this manner may be obtained. This will, it is hoped, give some idea to oyster planters of the feasibility of raising their own seed oysters on a commercial basis. It is expected that this year seed oysters will sell for $1.35 to $1.50 per bushel plus freight to the planting area. These prices leave a good margin for the labor and material involved in handling shells and making wire bags if some thought is given to devise economical methods of carrying out the operation. Some of the answers to the problem should be available after this summer's work so that the method can be evaluated. It is felt that at the present prices the work offers some promise of alleviating the problem of seed-oyster costs.

Massachusetts

REGULATIONS FOR WEIGHING, SORTING, AND CULLING FISH AT LANDING PORTS: Certain rules and regulations for the weighing, sorting, and culling of fish were adopted by the Massachusetts State Commissioner of Labor and Industries. The regulations, which became effective May 1, 1956, follow:

General Laws, Chapter 94, Section 86 (Ter. Ed.)
as Amended by Chapter 415 Acts of 1956

The Commissioner of Labor and Industries may adopt, amend or repeal, and shall enforce, all such reasonable rules and regulations, and orders thereunder, as may be necessary or suitable in relation to the weighing, sorting and culling of fish when landed from a vessel or boat. Whoever violates said rules or regulations or orders thereunder shall be punished by a fine of not less than fifty nor more than one hundred dollars.

Rules and Regulations Relative to the Weighing, Sorting and Culling of Fish Adopted by the Commissioner of Labor and Industries.

Cull of Fish in All Ports

Haddock	Over 2½ lbs.	Cusk	Over 3 lbs.
Scrod haddock	1½ to 2½ lbs.	Scrod cusk	1½ to 3 lbs. incl.
Cod, extra large	Over 25 lbs.	Halibut, extra large	Over 125 lbs.
Large cod	10 to 25 lbs., incl.	Large halibut	60 to 125 lbs.
Market cod	Over 2½ lbs. to 10 lbs.	Medium white halibut	12 to 60 lbs.
Scrod cod	1½ to 2½ lbs., incl.	Chicken halibut	7 to 12 lbs.
Lemon sole	4 lbs. and over	Snapper halibut	Under 7 lbs.
Blackbacks	2 lbs. to 4 lbs.	Medium grey halibut	12 to 60 lbs.
Medium blackbacks	1 lb. to 2 lbs.	Large mackerel	2¼ lbs. and over
Small blackbacks	Under 1 lb.	Medium mackerel	1½ to 2¼ lbs.
Grey sole	2 lbs. and over	Small mackerel	1 to 1½ lbs.
Small grey sole	Under 2 lbs.	Tinker mackerel	½ to 1 lb.
Yellowtails	½ lb. and over	Tack mackerel	Under ½ lb.
Dabs	1 lb. and over	Butterfish	325 fish or less per 100 lbs.
Small dabs	Under 1 lb.	Small butterfish	More than 325 fish per 100 lbs.
Pollock	4 lbs. and over	Redfish (ocean perch)	120 fillets or less per 10 lbs.
Scrod pollock	1½ to 4 lbs.	Small redfish (ocean perch)	More than 120 fillets per 10 lbs.
Large fluke	4 lbs. and over	Whiting	No cull but designated "round" or "h. & g."
Medium fluke	3 to 4 lbs.		
Small fluke	1½ to 3 lbs.	Swordfish	Over 110 lbs.
Large hake	6 lbs. and over	Baby swordfish	110 lbs. and under
Medium hake	Over 2½ to 6 lbs.		
Small hake	1½ to 2½ lbs., incl.	Scallops	9 lbs. per gallon, no cull

Weighing of Fish

In all ports, an allowance shall be made for tare weight of ½ lb. per bag on scallops. Tare weights of vehicles, barrels, boxes or other containing units shall be regularly taken. All weighing operations shall be in accordance with the Rules and Regulations established by the Director of Standards and Necessaries of Life1/.

In the Port of Boston, an allowance of five percent for ice and other foreign substance shall be made in bulk weighing, except in the circumstance where an abnormally large amount of ice is in the fish a percentage allowance may be mutually agreed upon by the buyer and the seller.

In the Port of Gloucester, on grey sole and dabs, an allowance for ice and other foreign substance of 10 lbs. per 250-lb. barrel of fish shall be made unless other allowance is mutually agreed upon by the buyer and the seller. No allowance to be made for ice and other foreign substance on groundfish.

In the Port of New Bedford, on groundfish and flounders, an allowance shall be made of 4 lbs. per 100-lb. box or basket for ice or other foreign substance.

Ernest A. Johnson,
Commissioner of Labor & Industries

1/ General Laws, Chapter 94, Section 176, " 'Weight' in a sale of commodities by weight shall mean the net weight of all commodities so sold; and contracts concerning such sales shall be so construed;. ..."

New York City

SUGGESTIONS FOR CRAB MEAT PACKERS: The Director of the Bureau of Food and Drugs of New York City's Department of Health in a letter addressed to fresh crab meat packers makes suggestions for shipping crab meat to New York City. The letter points out that fresh crab meat shipped to the City of New York must conform to the bacterial standards prescribed in Section 163A of New York City's Sanitary Code. In order to meet these standards, it is absolutely essential that crab meat be prepared, handled, and packed under strict sanitary precautions in a plant that is certified by the state inspection authority controlling the crab meat industry in your State.

Pasteurizing crab meat in hermetically-sealed cans.

To prevent rise in bacterial content, it is also essential that the crab meat be adequately refrigerated from the period of packing to the time it reaches its destination and that delay be avoided between packing and shipment.

The following suggestions are made to aid in maintaining bacterial quality control during the long haul in shipments of crab meat to the City of New York.

1. Use shipping containers of sufficient size to provide maximum space for storage of ice.

2. Pack cans into barrels or other shipping containers in a manner that will allow spaces between the cans to facilitate thorough icing and re-icing all around can surfaces. Avoid overloading or stacking cans directly on top of each other.

3. Eliminate delays in time and additional handling by direct shipments from your plant to New York City instead of reshipments through another dealer.

4. Check your carrier's equipment relative to refrigeration or ability to maintain cold temperatures; also location of icing stations en route.

5. Request re-icing of your shipments in transit at suitable intervals, especially in warm and hot weather.

6. Arrange for direct deliveries of your shipments if possible without long delays resulting from consolidations or transfers of loads, lay-overs at transfer points, circuitous routing, etc.

It is well to bear in mind that attempts at savings in shipping costs per package is negligible in comparison with losses resulting from spoilage or increase in bacterial counts in the product due to inadequate refrigeration or icing during transportation.

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SUGGESTIONS FOR TRANSPORTERS OF FRESH CRAB MEAT: At a recent meeting held at the New York City Department of Health with health officials of the Southern states which ship fresh crab meat to New York City, considerable discussion centered around methods of refrigeration used on vehicles during long hauls of shipments from the crab-meat packing plants to market destinations. It was decided that the City's Department of Health send a letter to every trucking and express firm before the coming warm weather season and point out the necessity for proper care during transportation.

The Director of the Bureau of Food and Drugs of New York City's Department of Health in the letter points out that fresh crab meat is a ready-to-eat food that is generally consumed without further cooking. Continuous adequate refrigeration is a very important factor in maintaining quality control. If it is not kept at a very cold temperature at all times from point of departure to point of destination, bacteria may multiply to enormous numbers and cause spoilage of the crab meat or food poisoning to the consumers. You are urged to alert your employees to take all precautions necessary to assure that crab meat be kept cold while transported in your carriers, the letter to the transportation companies continues.

The importance of refrigeration is being constantly stressed to the crab meat packers. However, the following suggestions to trucking and other transportation companies may aid in preserving quality during transportation:

1. Check amount of ice and salt carried to assure that it is adequate for the entire load. Check insulation for defects.

2. If mechanical refrigeration is used, check for proper working order and if adequate to maintain sufficiently low temperatures for the load carried. If necessary, supplement with dry ice.

3. Precool vehicles during hot weather before loading.

4. Place loads in such a manner as to allow circulation of air around the shipping containers. Use of floor racks for this purpose is advisable.

5. Where ice is used for refrigeration, check drains to insure against stoppages. Plugs for ice bunkers should be tight-fitting.

6. Do not skimp on ice in warm and hot weather and see that all cans inside barrels and boxes are well re-iced. Arrange with packers for re-icing of their shipments en route.

7. Provide re-icing stations at suitable intervals along routes and make certain that stops are made for the purpose of re-icing.

8. Avoid the alleged practice of skipping re-icing stations and then re-icing just before arrival in New York City to mislead receivers.

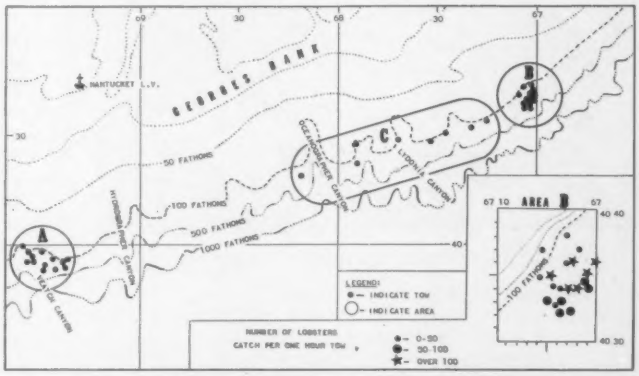
9. Avoid long delays in transit caused by consolidations or transfer of loads, lay-over at transfer points, circuitous routing, etc.

10. Make employees aware of precautions to be taken during long hauls in hot weather when vehicles are subject to a great deal of heat over the highways.

North Atlantic Fisheries Exploration and Gear Research

EXCELLENT CATCHES OF DEEP-WATER LOBSTERS BY "DELAWARE" (Cruise 19): Excellent catches of deep-water lobsters were made by the Service's exploratory fishing vessel Delaware. The 12-day cruise was completed with return of the vessel to East Boston on May 11. The purpose of the cruise was to evaluate the commercial fishing potential for deep-water lobster at this season.

Over 8,900 pounds of deep-water lobsters averaging 5 pounds each were taken by 41 exploratory tows of 1-hour duration. Gear used was a standard No. 41 otter trawl and catches ranged from a low of three lobsters per one-hour tow in the Veatch Canyon area to 211 per one-hour tow east of Lydonia Canyon. The largest catches were made in the 175- to 225-fathom range.



M/V Delaware Cruise 19, April 30-May 11, 1956.

A total of 1,032 lobsters was tagged and released where caught. Approximately 200 large egg-bearing females were turned over to the Massachusetts Division of Marine Fisheries for use in stocking inshore waters. In addition, two tagged lobsters were recaptured by the Delaware on May 5 and 6, both in the same locality as released. One was tagged November 19, 1955, and the other May 6, 1956.

During the cruise radio contact with the commercial trawler R. W. Griffin, Jr. indicated that two tagged lobsters were recaptured in the vicinity of Veatch Canyon on May 10, 1956. One of these was tagged and released from the Delaware on January 26, 1956, and had moved approximately 90 miles westward along the edge of the Continental Shelf. The other was tagged and released from the Delaware on May 1, 1956, and was recaptured in the same area as released.

The Delaware left East Boston on May 21 for a 13-day trip (Cruise 20) to the Sable Island area South of Nova Scotia to continue studies of the deep-water distribution of ocean perch.

North Atlantic Fisheries Investigations

SURVEY OF HADDOCK EGGS AND LARVAE DISTRIBUTION CONTINUED BY ALBATROSS III (Cruise 73): Georges Bank, Browns Bank, and the Gulf of Maine were surveyed for haddock eggs and larvae by the Service's research vessel Albatross III during Cruise 73 (April 17-28). In addition, the temperature, salinity, and the general circulation pattern in the Gulf of Maine and Georges Bank area were studied.

U. S. Fish and Wildlife Service research vessel Albatross III.

Continuous plankton tows at the surface and 10 meters with Hardy Plankton Recorders, 241 bathythermograph lowerings, 120 salinity samples, and 20 surface tows with the standard meter net were made. Eighteen samples of eggs were hatched out for identification purposes and a total of 800 drift bottles were released throughout the area of the cruise.

The cruise provided collections of haddock, cod, sea crab, and rockling eggs plus haddock, cod, herring, hake, and sand launce larvae. Haddock eggs were found at all locations sampled with the net except in the central Gulf of Maine indicating that the spawning of this species extended over a much greater area than that observed during any previous cruises.

The widely-spread haddock eggs if successful in meeting the vicissitudes of life in the ocean waters, may result in an abundant haddock year-class and good haddock fishing on Georges Bank in 1959. If meteorological and hydrographic conditions are favorable during the coming months a strong year-class will develop.

Future cruises of the Albatross III will follow the drift of these young fish in May and June and a census will be made in September after they have taken up life on the bottom and are no longer at the mercy of tide and current.

The Albatross III sailed on May 2 to study the effectiveness of different sizes of nylon mesh in releasing small unmarketable sizes of haddock on George Bank and Browns Bank.

* * * * *

SELECTIVITY OF NYLON COD ENDS TESTED BY "ALBATROSS III" (Cruise 74): To determine the selectivity of sizes of haddock with nylon cod ends of $4\frac{1}{4}$, 5, and $5\frac{3}{4}$-inch meshes (between centers) was the purpose of Cruise 74 of the Service's research vessel Albatross III. The trip took place from May 2-May 10, 1956.

A total of 69 tows were made on Georges Bank using $4\frac{1}{4}$, 5, and $5\frac{3}{4}$-inch nylon mesh cod ends and a 5-inch dacron cod end. An abundance of one- to six-year old haddock provided good catches for all four cod ends tested. A total of 69 tows were made of which 62 produced usable results. Approximately 26,000 haddock were taken and all were measured.

A summary of results is presented in the table. These can be considered only tentative because of the large quantity of data involved which cannot be completely analyzed at sea.

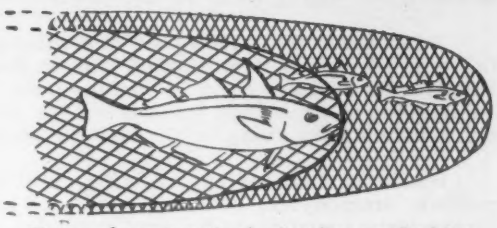


Diagram of experimental cod end used to test selectivity.

Both the nylon and dacron cod ends were of braided twine of single construction. Two gauges were used during the cruise: the ICNAF-type pressure (wedge) gauge and the Scotch-type (longitudinal pressure) gauge. The mesh sizes given represent averages of measurements made with both gauges. No consistent difference between the two gauges was observed for the nylon twines when the Scotch gauge was set for 10-12 pounds and the ICNAF gauge was used with 8-10 pounds pressure. The Scotch gauge did give rather smaller measurements for the dacron cod end.

Cod End (Size Between Knot Centers New)	No. of Tows	No. of Fish			50% Points (cm.) Range for Individual Tows			Mesh Size Avg. for All Meshes	(Internal) Avg. for the Last 10 Rows
		Cover	Cod End	Total	High	Low	Avg.		
$4\frac{1}{4}$" nylon	11	2,831	2,378	5,209	42	39	40	$4\frac{1}{4}$ in.	$4\frac{7}{16}$ in.
5" nylon (1)	10	931	2,460	3,391	35	42	37	$4\frac{13}{16}$ "	$4\frac{11}{16}$ "
5" nylon (2)	12	3,254	2,143	5,402	49	41	44	$4\frac{7}{8}$ "	$5\frac{1}{4}$ "
$5\frac{3}{4}$" nylon	14	2,113	3,073	5,186	56	41	46	$5\frac{1}{4}$ "	$5\frac{1}{4}$ "
5" dacron	15	2,106	4,659	6,765	43	37	39	5 "	$4\frac{7}{8}$ "

The rather large range in 50-percent points for individual cod ends was due to (1) changes in mesh size during the cruise; (2) random error caused by small catches for certain tows; (3) diurnal differences in escapement, the high selection points occurring in mid-day; and (4) other variables.

The division of the 5" nylon results into two parts is a result of reversing the cod end after the first 10 tows. This cod end had been used before causing the meshes to be enlarged at one end. Nylon (1) results are with the large meshes at the forward end, nylon (2) results are with the large meshes in the "normal" position, at the after end of the cod end.

Changing ends resulted in an increase of 7 centimeters in the 50-percent point, indicating that fish escape primarily through the after part of the cod end. This was further demonstrated by the improvement in the 50-percent-point-mesh size relationship when only the average of the last 10 rows of meshes in the cod end was used (see table).

The braided nylon provided a greater escapement of haddock than double manila cod ends of the same mesh size, in general, would be expected to provide.

Twenty large cod were returned alive to the laboratory to be used by the Retina Foundation for eye research. Some live haddock and flatfish were also returned.

The Albatross III sailed again May 16 (Cruise 75) for the purpose of sampling haddock eggs and to obtain hydrographic data.

* * * * *

HADDOCK EGGS AND LARVAE DISTRIBUTION (ALBATROSS III, Cruise 75): To determine the distribution of haddock eggs and larvae, temperature, and salinity, and the general circulation pattern in the Gulf of Maine, Georges Bank, and the Southern New England Banks was the purpose of Cruise 75 of the Service's research vessel Albatross III (May 16-29, 1956).

Approximately 3,200 miles of continuous plankton tows were made at the surface and 10 meters with Hardy Plankton Recorders; 325 bathythermograph lowerings, 165 salinity samples, and 22 surface tows with the standard meter net were made; 18 samples of eggs were hatched out for identification purposes. A total of 1,068 drift bottles were released throughout the area.

Haddock, cod, plaice, rockling, whiting, and yellowtail eggs; haddock, cod, pollock, ammodytes, herring, hake, and butterfish larvae were found. Haddock larvae were found along the southern edge of Georges Bank and 60 miles south of Montauk Point, Long Island.

The Albatross III was scheduled to sail again on June 11, 1956, for the final egg and larval fish survey of the year.

North Atlantic Herring Research

VESSEL CHARTERED TO CONTINUE HERRING EXPLORATIONS AND GEAR RESEARCH: The program of exploratory fishing and gear development for the Maine herring started by the Service's vessel Theodore N. Gill in 1955 will be continued in 1956 by the chartered 62-foot Gloucester motor vessel Metacomet. The Metacomet departed for its first cruise on May 9 and is scheduled to return May 18.

Metacomet, vessel chartered by the Fish and Wildlife Service to continue program of exploratory fishing and gear development for the Maine herring.

The objectives of the first cruise were to (1) make echo-soundings along the Maine Coast and in the offshore waters to locate schools of herring that may be made available to the sardine fishermen, and (2) make trial sets with a one-boat midwater trawl when schools are located by the echo-sounder, in an attempt to develop a dependable method of sampling the schools located at various depths.

In case commercial-size schools of sardines are located, the size and the location of the schools will be broadcast to the sardine fishermen over radio frequencies 2638 kc. and 2738 kc.

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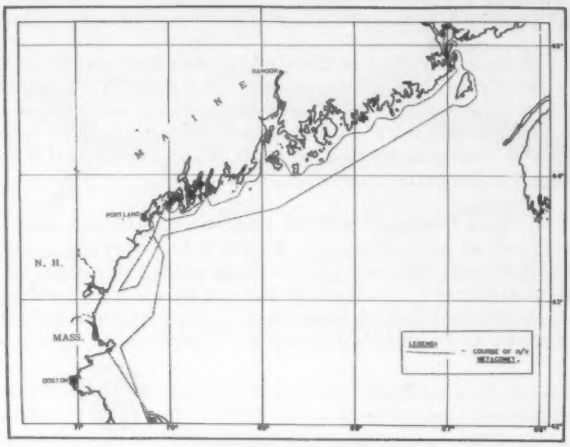
ECHO-SOUNDINGS AND SAMPLES OF HERRING TAKEN BY "METACOMET" (Cruise 1): Herring were located on the echo-sounder and samples taken by the midwater-trawl in Middle Bay part of Casco Bay and at Spruce Point, near Long Island in Penobscot Bay by the M/V Metacomet on its first cruise. This vessel,

which has been chartered by the U. S. Fish and Wildlife Service to continue exploratory fishing and gear development for the Maine herring started by the Service's vessel Theodore N. Gill in 1955, left port on May 9 and returned on May 18. The samples of the fish taken were 0-year-class herring brit from last autumn's spawning. Sounder traces similar to those in Middle Bay were also recorded in New Meadows River.

Fish were located on the echo sounder on May 9 and May 11 near Portland Head and on May 11 and May 16 near the Portland Lightship. These soundings were scattered and small. The midwater trawl was not set at these points due to rough seas.

Small traces of schooled fish, apparently herring, were recorded in St. Andrews Bay (Passamaquoddy Bay) during the evening and night of May 13. The largest tracings were recorded near Ministers Island and McAnns Head.



M/V Metacomet (Cruise 1).

Widely-spaced scattered traces were recorded between the Portland Lightship and Boon Island on May 16.

Small scattered schools were also recorded near Race Point, Cape Cod, on May 18.

During this cruise the coastline of the Gulf of Maine was surveyed with a recording-type echo-sounder along the course lines shown in the diagram. This was done in an attempt to locate populations of sardine-size herring. No such schools were located and positively identified. However, the schools sounded in Passamaquoddy Bay and near the Portland Lightship appeared likely to be herring of sardine size.

A run was made to the Cape Cod area to test the midwater trawl on larger herring. During the one day and night spent there no schools in suitable position for trawling were located. The herring in this area appeared to be close in near the beaches.

North Pacific Exploratory Fishery Program

EXPERIMENTAL MIDWATER TRAWLING TO BE TRIED BY "JOHN N. COBB" (Cruise 27): Experimental midwater trawling is being tried by the Service's exploratory fishing vessel John N. Cobb on Cruise 27 which started from Seattle on May 14. On this six-week cruise several sizes of midwater trawls, both nylon and cotton, will be tested, ranging from a 30-foot to 50-foot square opening at the mouth. These nets were made at the Service's gear research station at Coral Gables, Fla., where underwater television and skin divers were used to observe the action of the gear under actual towing conditions.

Arrangements were made for gear experts from the Biological Station of the Fisheries Research Board of Canada at Nanaimo, B.C., to join the John N. Cobb for part of the cruise to try the successful Canadian midwater herring trawl in offshore waters and to compare the operation of the Canadian trawls with those furnished from Coral Gables. A biologist from the trawl-fish division of the State of Washington Department of Fisheries was also scheduled to participate.

In recent years midwater trawls have been used successfully in Europe and in British Columbia for herring. The John N. Cobb will try to determine if fish such as Pacific ocean perch, cod and others which spend at least part of their time off the bottom can be efficiently taken by midwater trawling. Special attention will be given to rocky bottom areas off Washington and Vancouver Island which are too rough for bottom trawls.

A "Sea Scanar" will be used to locate schools of fish at middepths. To keep the trawl at proper depth, a new telemetering instrument developed at the University of Miami Marine Laboratory under contract with the Service will be employed. The instrument attaches to the trawl or trawl cable and sends out continuous battery-activated sound impulses to a hydrophone streamed by the vessel. Depth of the trawl is calculated from the frequencies of the signals received.

Pacific Halibut Fleet Began Fishing May 20

Although the International Pacific Halibut Commission in its regulations for the 1956 North Pacific halibut season set May 12 as the opening date, reports from the West Coast indicated that the halibut fleet did not sail in order to begin fishing by that date. In an effort to level off some of the heavy landings that occur on some days, fishermen of vessels fishing out of Puget Sound, British Columbia, and Alaska ports voted to delay actual fishing for eight days or until May 20.

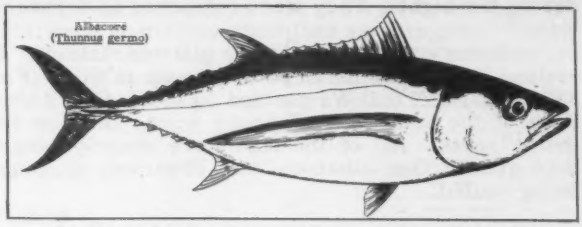
Landing a halibut aboard a West Coast long-liner.

The fishermen's unions also voted that (1) halibut vessels carrying three or more men would tie up for seven days between trips to the grounds and (2) small vessels carrying either one or two men will be permitted to fish for 14 days to begin the season and then tie up and fish for alternating periods of seven days.

However, although most of the North Pacific halibut fleet did not begin fishing until May 20, small amounts of halibut caught by independent vessels which are not a party to the agreement or caught incidentally to other fishing were expected to reach port early in the week of May 14.

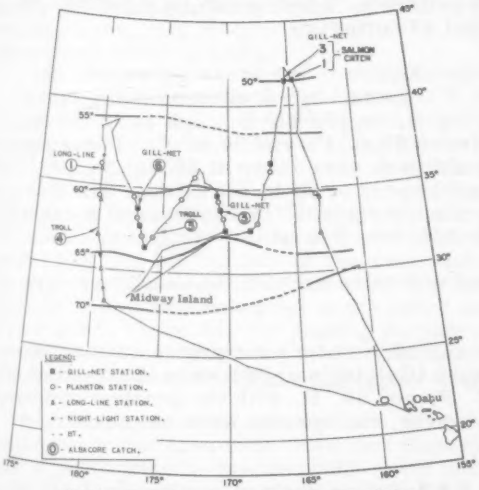
Pacific Oceanic Fishery Investigations

SPRING ABUNDANCE OF ALBACORE TUNA NORTH OF HAWAIIAN ISLANDS CHECKED BY "CHARLES H. GILBERT" (Cruise 27): Studies of potential albacore tuna fishing grounds by the research vessel Charles H. Gilbert of the Service's Pacific Oceanic Fishery Investigations have been extended so far up into the North Pacific that observations of whales and fur seals at the more northern fishing stations have become commonplace.



There was some surprise, however, when the Charles H. Gilbert, which returned May 4 from a 2-month cruise in the area north of Midway Island, brought back 4 small salmon. The salmon, which were estimated to weigh about one pound each, were caught in gill nets set to capture albacore tuna at about 41° N. latitude. These fish will be sent to the Pacific Salmon Investigations at Seattle, Wash., for study.

This cruise of the vessel was planned to check the spring abundance of the albacore north of the Hawaiian Islands, as part of a continuing year-round program of study of the distribution of this valuable wide-ranging tuna species. Experimental fishing was done with long lines, gill nets, and trolling lines along the albacore zone between 180° and 165° W. longitude as far as 42° N., an area which is centered roughly north of Midway Island. Albacore appeared to be scarce in the area at this season, but small numbers were taken on all the types of fishing gear used. Those captured in the gill nets and on trolling lines weighed 7-8 pounds each; the fish taken at greater depths on the long line weighed about 40 pounds each.



Charles H. Gilbert Cruise 27 (3/17/56-5/4/56).

Plankton was sampled on the fishing grounds, and the scientists aboard reported that this basic fish food appeared to be somewhat more abundant in the western part of the survey area. Large squid, weighing 2-3 pounds, were also captured on the western survey section.

The weather was rough throughout much of the cruise, and the vessel rode out one storm with winds over 70 miles an hour.

Five long-line stations were fished along 180° longitude between 28° N. and 36° N. latitude in waters with surface temperatures ranging between 57.7° F. and 69.0° F. and two stations along 163° W. longitude between 32° N. and 34°30' N. latitude, in 60.8° F. and 63.0° F. surface temperatures. Only one albacore (57 pounds) was taken. This catch was made at the northernmost station at 36°08' N., 179°55' W. in 57.7° F. water. The remaining long-line catch consisted of 35 great blue sharks, 1 mako shark, 9 lancetfish (Alepisaurus sp.), 2 broadbill swordfish, and 2 dolphin (Coryphaena hippurus).

Eleven gill-net stations were occupied during the cruise. The gear consisted of 12 shackles of nylon netting on loan from the Pacific Salmon Investigations (PSI) in Seattle, Wash., and 1 shackle of POFI nylon net. Each of the 12 shackles of the PSI nets measured 20 feet in depth and 300 feet in length and the mesh sizes ranged from $2\frac{1}{4}$" to $5\frac{1}{4}$" stretched measure. The POFI net had 7" mesh, was 30 feet deep and 300 feet in length. The nets were set at dusk and left to drift free of the vessel during the night. They were retrieved at daybreak.

Albacore were taken at two gill-net stations. One station at 33°45' N., 176°57' W. yielded 6 albacore (6-12 pounds each) in 61.8° F. water and the other station at 33°49' N., 170°32' W. yielded 3 ($10\frac{1}{2}$-, 11-, $12\frac{1}{2}$-pound) fish in 62.3° F. water. Five of the total of 9 albacore were taken on the $5\frac{1}{4}$"-mesh nets and four on the $4\frac{1}{2}$"-nets. All of the fish were merely tangled on the tail or fins rather than gilled. One albacore was observed slipping off the net while the gear was being hauled.

Two net stations were occupied in 50° F. and 50.7° F. waters and both resulted in the capture of small sockeye salmon (Oncorhynchus nerka). At 41°28' N., 165°18' W. (50° F. surface temperature) 3 salmon (36.1, 39.5, and 40.0 cm. fork length) were taken close together on a $4\frac{1}{2}$"-mesh net. Another salmon, 37.6 cm. in length, was taken at 41°30' N., 164°33' W. (50.7° F.) on a $3\frac{1}{4}$"-net. All of the salmon were gilled. The last fish taken was alive when the nets were retrieved.

Two amberjacks (Seriola dumerili) were taken at 32°46' N., 176°42' W. in 62.5° F. water. They were taken on a $5\frac{1}{4}$"-mesh net. Additional gill-net catches included: 1 small broadbill swordfish, 6 pomfrets, 1 flying fish, 1 pilotfish, 36 great blue sharks, 2 mackerel sharks, and 92 cuttlefish.

Surface trolling proved to be very unproductive in the areas surveyed. In 1,598 line-hours of direct trolling at 6.0-7.0 knots, only 7 albacore were taken. These were taken at 32°08' N. and at 32°20' N. on 179°58' E., and at 32°30' N., 175°17' W., in surface temperatures between 63.0° F. and 64.5° F. These fish weighed between 11 and 14 pounds. Two skipjack were taken at 29°39' N., 161°52' W. in 70.2° F. water while trolling at a vessel speed of about 8.5 knots. The fish weighed $7\frac{1}{2}$ pounds each. There were no visible signs of the presence of a school of fish when these skipjack were caught. In addition, 9 dolphin were taken.

A total of 6 albacore tuna were tagged and released with the California-type plastic tube tags.

Thirteen night-light stations were occupied in waters ranging in surface temperatures from 50.0° F. to 68.5° F. Saury (Cololabis saira) were observed at stations with water temperature between 57° F. and 64° F. with the greatest numbers occurring between 60° F. and 62° F. However, the species were not abundant at any of the stations.

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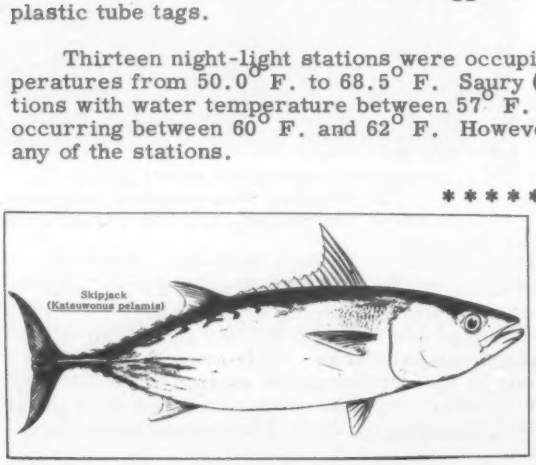
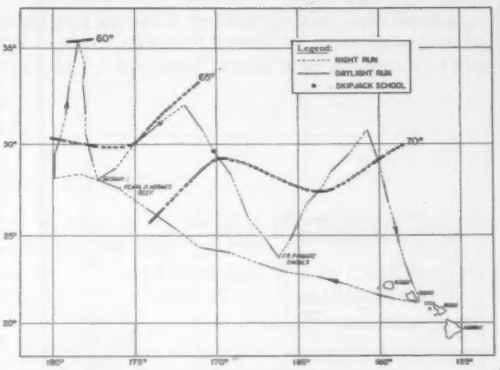


SKIPJACK TUNA SPRING DISTRIBUTION NORTH OF LEEWARD ISLANDS SURVEYED BY "JOHN R. MANNING" (Cruise 30): A survey of the bait resources of the Leeward Islands and ascertaining the abundance of skipjack tuna to the north and west of the Hawaiian Islands during the preseason period was the purpose of the month-long (March 15-April 20) cruise of the research vessel John R. Manning, operated by the Service's Pacific

Oceanic Fishery Investigations. Moderately-abundant stocks of bait were found in the Leeward group, but there was a dearth of skipjack tuna schools in the area covered. This was somewhat surprising as earlier cruises, incidental to studies on albacore tuna, had detected surprisingly large numbers of skipjack during midwinter.

Direct trolling with 6 lines showed a lack of skipjack in the waters north of the Leeward Islands as only two schools were positively identified as skipjack. These schools, one at 31°06' N., 173°26' W. and the other at 29°44' N., 170°10' W. were observed only after fish struck the trolling lines. Both were small schools and were composed of 10-lb. and 4-lb. skipjack respectively, and were found in water with surface temperature of 68° F. Every attempt at fishing the schools with live bait failed.

There was a general lack of fish in the northern area scouted, and besides the two skipjack schools, only one other dolphin school and two bird-accompanied schools were encountered; the latter schools were unidentified. Seven other fish schools were seen in Hawaiian waters (within 200 miles from land) and these were one dolphin, 2 skipjack, and 48 unidentified schools. Two skipjack and 17 dolphin were caught on the trolling lines, and most of the latter were taken north of Oahu.



John R. Manning Cruise 30 (3/15/56-4/20/56).

A thorough bait survey of French Frigate Shoals, Pearl and Hermes Reef, and Midway Island was conducted. Bait surveys at the three different localities showed that the Hawaiian silverside or iao (P. insularum) was the predominant and most readily-caught bait species. This species was found in equal abundance at Sand and Eastern Islands of the Midway Island group where 217 and 246 buckets of iao were seen respectively. Among the six southern islands visited at Pearl and Hermes Reef, Seal Island was the most promising and 140 buckets of iao were observed there. At French Frigate Shoals an estimated 90 buckets of iao were seen at East Island and none or only small amounts of bait was observed at the other northern islands, extending from Tern to Little Gin I. Live bait for fishing purposes was taken from Pearl and Hermes Reef and Midway Island but only small samples of bait for length frequency and maturity studies were caught at French Frigate Shoals.

No skipjack or other tuna were available for tagging. Environmental data were collected in the area of the skipjack fishery adjacent to Oahu at the beginning and end of the cruise by means of BT casts and double-oblique 60-meter plankton tow with the 1-meter net; surface salinity and phosphate samples were also taken.

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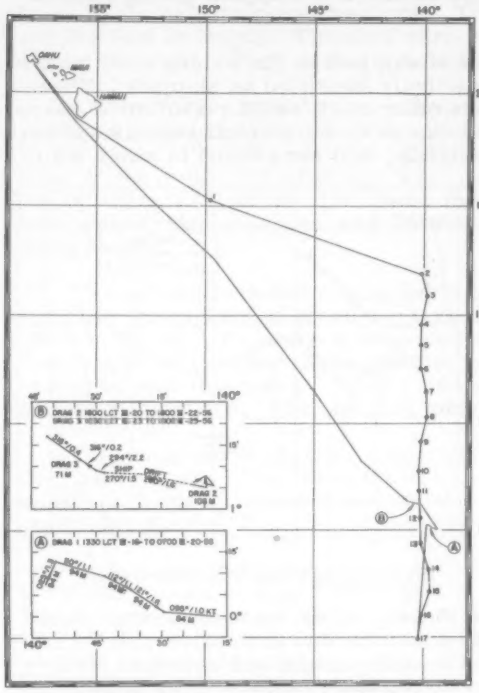
OCEANOGRAPHY AND BIOLOGY ALONG THE EQUATOR STUDIED BY "HUGH M. SMITH" (Cruise 33): Study of the oceanography and biology of waters along the equator, about 1,000 miles south of Hawaii, was the purpose of the one-month cruise by the research vessel Hugh M. Smith of the Service's Pacific Oceanic Fishery Investigations. The vessel returned to port April 20.

On this cruise the vessel operated in an area where previous investigations by Fish and Wildlife Service ships have indicated that there is a considerable movement of water from the depths up to the surface. This upwelling brings fertilizing

chemical substances up into the sunlit layer of the ocean and results in a rich growth of minute plant and animal life--the plankton--to feed the small fish and squid which in their turn support the large stocks of tuna in the area.



Hugh M. Smith Cruise 33 (3/2/56-4/1/56).

The temperature and chemical content of the water, the speed and direction of the ocean currents, and the abundance of plankton were studied in a 1,000-mile strip of ocean which spans the equator to the southeast of Hawaii. Preliminary results indicate that the upwelling of the deeper cooler waters at the equator was more pronounced than it had been at the time of earlier cruises. Water temperatures near the equator were found to be lower, and the abundance of plankton in the surface waters was considerably higher. The results of fishing cruises by Fish and Wildlife Service vessels scheduled to be carried out in this area this summer will show whether or not these apparently favorable conditions will produce a corresponding abundance of tuna.

The scientific party aboard the Hugh M. Smith also made two special studies at the equator and at 1° N. latitude to discover the speed at which the sea water was flowing away from the area of upwelling near the equator. In this work drags were hung deep in the water from floats, which were then followed by the ship to trace their course and speed. The objective of these studies is to find out where a drifting mass of fertile water, with its freight of developing fish food, is likely to be when it becomes a good feeding ground for tuna, and thus ultimately to be able to predict where the tuna fishing will be good at any given time.

Only two night-light stations were occupied while tracking the drags and only one of these yielded fish. The scarcity of fish may have been due either to the large schools of squid and/or white-tipped sharks (1 to 7) which were present at all times.

Only eight fish schools were sighted, of which three were identified as skipjack tuna and the remainder unidentified. Five were sighted between 0°28' N. and 5°00'S., one at 12°59' N., 149°33' W., and one southwest of Maui on the return voyage.

The total catch on the trolling lines consisted of two dolphins (Coryphaena hippurus).

* * * * *

1955/56 SAMPLING PROGRAM ON EQUATORIAL TUNA COMPLETED: The year-round equatorial tuna sampling program begun in March 1955 was completed in February 1956. The abundance of yellowfin tuna continued to be low during the first months of 1956. The highest catch rates were observed close to the islands, particularly those to the north of the equator, i.e., Palmyra and Kingman Reef. Long-line catches made in 1955 at the same time of year and in the same area as a United States commercial fishing venture in 1954 showed comparatively low catch

rates. This may be related to sea surface temperature conditions which at Christmas Island were lower than usual throughout 1955 with the trend continuing during January and February 1956. Tagging of viable yellowfin for migration studies continued. To date over 1,000 yellowfin have been tagged in this area.

The analysis of these year-round cruises has begun. One interesting aspect of the data is that maximum fishing depth, determined by chemical sounding tubes attached to the deepest hooks of long-line gear, shows considerable variation with area and time of year. Knowledge of this variation is important, for the deeper hooks on long-line gear have the higher catch rates.

The catch rates in the open ocean were consistently below 2 yellowfin per 100 hooks. Those very close to the islands averaged about 3 yellowfin per 100 hooks with a range of 1 to 13. Previous years showed a seasonal trend in abundance with higher catch rates during July through September, but this trend was absent in 1955.

Public Eating Places Survey

FROZEN FISH AND SHELLFISH HELD IN COLD STORAGE BY PUBLIC EATING PLACES: It is estimated that during the period May 25-June 2, 1955, public eating places were holding 4.7 million pounds of frozen fish and 5.4 million pounds of frozen shellfish in freezers or cold storages, or a total of 10.1 million pounds of frozen fish and shellfish, according to the results of a sample survey conducted by the U. S. Bureau of Census for the U. S. Fish and Wildlife Service with funds provided by the Saltonstall-Kennedy Act of 1949.

The breakdown of this total of 10.1 million pounds by types of establishments shows that 57 percent or 5.8 million pounds were held by restaurants as compared with an inventory of 1.3 million pounds for cafeterias and about 800,000 pounds for drinking places, lunch counters, and refreshment stands (see table).

The average frozen fish and shellfish inventory per eating place for the United States was about 49 pounds with a range of 55 pounds for the average for restaurants to 11 pounds for the average for drinking places, lunch counters, and refreshment stands.

A breakdown by regions shows that the South accounted for the greater part (49 percent) of the total frozen fish inventory held by public eating places, whereas, the Northeast showed the largest inventory of frozen shellfish (1.9 million pounds).

As might be expected, when public eating places are grouped according to their reported total annual sales, the holdings of fish and shellfish per establishment varied directly with total sales. Eating places in the $100,000 or more category averaged about 366 pounds of frozen fish and shellfish in cold storage, compared with less than 8 pounds in the less than $10,000 annual sales size group.

This study on total cold-storage inventory of frozen fish and shellfish in eating establishments is one part of a broader study of fish and shellfish consumption characteristics in public eating places. The findings are based on a nationwide scientific sample survey of approximately 4,500 establishments during the week of May 25-June 2, 1955.

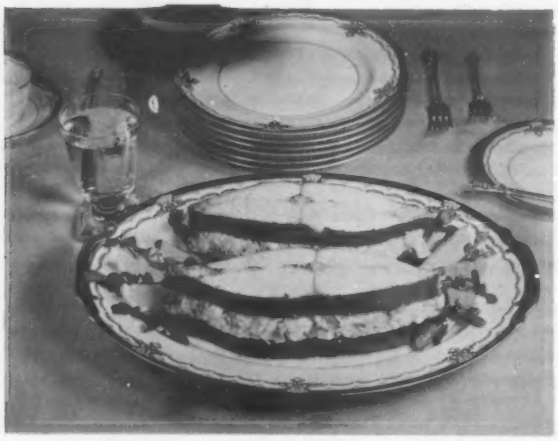
Frozen Fish and Shellfish Cold-Storage Stocks Reported by Public Eating Places Serving Fish or Shellfish (Estimated)

	Total		Fish		Shellfish		Average Inventory Per Establishment		
	Quantity	Percentage of Total	Quantity	Percentage of Total	Quantity	Percentage of Total	Total	Fish	Shellfish
	Million Lbs.	%	Million Lbs.	%	Million Lbs.	%	(Pounds)		
United States Total	10.1	100.0	4.7	100.0	5.4	100.0	48.5	22.6	25.9
Region:									
Northeast	2.7	26.7	0.8	17.0	1.9	35.2	39.7	11.8	27.9
North Central	1.8	17.8	1.0	21.3	0.8	14.8	30.2	16.8	13.4
South	3.8	37.7	2.3	48.9	1.5	27.6	82.8	50.1	32.7
West	1.8	17.8	0.6	12.8	1.2	22.2	52.2	17.4	34.8
Type of Establishment:									
Restaurants	5.8	57.4	2.3	48.9	3.5	64.8	54.9	21.8	33.1
Cafeterias	1.3	12.9	1.1	23.4	0.2	3.7	30.2	25.6	4.6
Restaurants or Cafeterias in Hotels	2.2	21.8	0.8	17.0	1.4	25.9	14.4	5.2	9.2
Drug or Proprietary Stores with Fountain	-	-	-	-	-	-	-	-	-
Other1/	0.8	7.9	0.5	10.6	0.3	5.6	10.9	6.8	4.1
City Size:									
500,000 or more	3.0	29.7	1.5	31.9	1.5	27.8	70.4	35.2	35.2
100,000 to 499,999	1.3	12.9	0.4	8.5	0.9	16.7	49.8	15.3	34.5
25,000 to 99,999	1.2	11.9	0.5	10.6	0.7	13.0	43.8	18.2	25.5
2,500 to 24,999	1.7	16.8	0.7	14.9	1.0	18.5	42.6	17.5	25.1
Less than 2,500	2.9	28.7	1.6	34.0	1.3	24.1	40.2	22.2	18.0
Sales Size:									
$100,000 or more	5.6	55.4	2.6	55.3	3.0	55.6	366.1	170.0	196.1
$ 40,000 to $99,999	1.8	17.8	0.7	14.9	1.1	20.4	72.6	28.2	44.4
$ 10,000 to $39,000	1.6	15.9	0.8	17.0	0.8	14.8	25.6	12.8	12.8
Less than $10,000	0.7	6.9	0.4	8.5	0.3	5.5	7.6	4.4	3.3
No Reply	0.4	4.0	0.2	4.3	0.2	3.7	29.0	14.5	14.5

1/ Includes drinking places, lunch counters, and refreshment stands.
Note: Detail does not necessarily add to totals, because of rounding. Above data represent estimates of the number of pounds of frozen fish and shellfish held in cold storage at the time the report was completed for the establishments in the survey (sometime during the period May 25-June 2, 1955).

* * * * *

SURVEY INDICATES FISH AND SHELLFISH DINNERS MORE PROFITABLE: Public eating places make as much or more profit from a serving of fish and shellfish as from a serving of steak, roast beef, roast pork, or chicken. This is the opinion of 64 to 69 percent (depending on the item compared) of managers or operators of 208,000 public eating places distributed throughout the United States which serve fish or shellfish and other foods. These findings are based on a scientific sample of 4,500 establishments, representing all public eating places in the United States. About 40 percent of the eating places estimated that more profit was made from a serving of fish and shellfish than from a serving of steak, while about 29 percent indicated the profit was the same. Similar percentages were obtained for roast beef, roast pork, and chicken, according to a survey made in May 1955 by the U. S. Bureau of the Census under contract to the U. S. Fish and Wildlife Service.



The opinions on profit per serving were obtained without regard to variations in size or price of a serving, or other factors which might offset profits. These facts are of importance to the fishing industry and proprietors of public eating places because they indicate that increased sales of fish and shellfish may lead to increased profits for public eating places.

Information obtained from the same survey also shows that of the total number of main-dish meals served in public eating places during the survey week, only 17 percent were fish and shellfish meals.

Final results of the survey, which is being financed by funds provided by the Saltonstall-Kennedy Act o f 1954, are scheduled for publication later in 1956.

Saltonstall-Kennedy Act Fisheries Projects

FISHERY ADVISORY GROUP RECOMMENDS CONTINUANCE OF PROGRAM: The American Fisheries Advisory Committee, at its third meeting in Long Beach, Calif., on May 1 and 2, went on record for the continuance of a balanced program of technological, economic, market development, and biological research and services through an enlarged and extended Saltonstall-Kennedy Act as the best way to aid the domestic fishing industry, Under Secretary of the Interior Clarence A. Davis stated May 17.

American Fisheries Advisory Committee. Left to right, seated: Lawrence W. Strasburger, New Orleans, La.; H. F. Sahlman, Fernandina Beach, Fla.; Alphonse J. Wegmann, Pass Christian Isles, Miss.; Arnie J. Suomela, Asst. Director, Fish & Wildlife Service; Wesley A. D'Ewart, Asst. Secretary, Department of the Interior; John L. Farley, Director, Fish & Wildlife Service; Harold R. Bassett, Salisbury, Md.; Lawrence Calvert, Seattle, Wash.; James S. Carlson, Boston, Mass.; Moses B. Pike, Eastport, Me.; standing: Norman B. Wigutoff, Exec. Secretary to the Committee; Dr. Lionel A. Walford, Chief, Branch of Fishery Biology, Fish & Wildlife Service; Thomas F. Sandoz, Astoria, Oreg.; J. Richards Nelson, Madison, Conn.; Arthur Sivertson, Duluth, Minn.; Paul Thompson, Asst. Chief, Branch of Fishery Biology, Fish & Wildlife Service; Donald P. Loker, Terminal Island, Calif.; Leon S. Kenney, St. Petersburg, Fla.; A. W. Anderson, Chief, Branch of Commercial Fisheries, Fish & Wildlife Service; David H. Hart, Cape May, N.J.; R. T. Whiteleather, Asst. Chief, Branch of Commercial Fisheries, Fish & Wildlife Service; Mark L. Edmunds, Garibaldi, Oreg.; Arthur H. Mendonca, San Francisco, Calif.

Established under the terms of the Saltonstall-Kennedy Act, which was passed in 1954 to promote increased production and marketing of domestic fishery products, this group meets periodically to advise the Secretary of the Interior on the various research and marketing activities which the Fish and Wildlife Service is conducting under the terms of the Act.

Assistant Secretary of the Interior Wesley A. D'Ewart, who is chairman of the Advisory Committee, served as presiding officer during the two-day meeting. In his opening remarks Secretary D'Ewart reaffirmed the Department's determination to give all possible aid to the industry.

A report on accomplishments since the last meeting in September 1955 was presented by Fish and Wildlife Service Director John L. Farley; A. W. Anderson, Chief, Branch of Commercial Fisheries; and Dr. L. A. Walford, Chief, Branch of Fishery Biology.

The Committee commented favorably on the program so far undertaken but urged expansion of the activities through continuance of the Act and the provision of a substantial increase in the funds which are available annually. At present the limit of expenditures in any one year is $3 million.

The Committee discussed a number of broad problems on production and marketing of domestic fishery products revolving essentially around two major points.

First, the problem of how to increase fish production to keep abreast of population growth so as to maintain or increase the present per capita consumption of fish came in for considerable attention. The Committee recommended market studies to determine areas of low consumption, as well as promotional campaigns, development of new products, and improvement in quality to aid in raising the present per capita consumption figure of about 10 pounds. Emphasis on exploration of new fishery resources and the development of more efficient gear to increase production was also stressed.

Secondly, the Committee also discussed the need for a well-rounded long-range program of biological research directed toward understanding the causes of fluctuations in fishery stocks in order to explain them, to predict their occurrence, and to use such understanding for the benefit of the fishery industries.

While in Long Beach the members of the Committee had an opportunity to visit the world's largest tuna cannery at Terminal Island where they observed tuna canning, from the unloading of the vessels to the finished product.

The next meeting of the Committee will be held in New Orleans, La., in January 1957.

Note: Also see Commercial Fisheries Review, April 1956, p. 21.

Shrimp

BETTER INSULATION OF SHRIMP VESSEL HOLDS NEEDED: Shrimp vessel fishing costs may be cut by reducing excessive ice consumption through the proper insulation of holds, according to an engineering study made for the U. S. Fish and Wildlife Service. Careful insulation of the holds, the study revealed, may reduce the consumption of ice in the hot summer months by as much as 700 pounds every day the vessel is at sea.

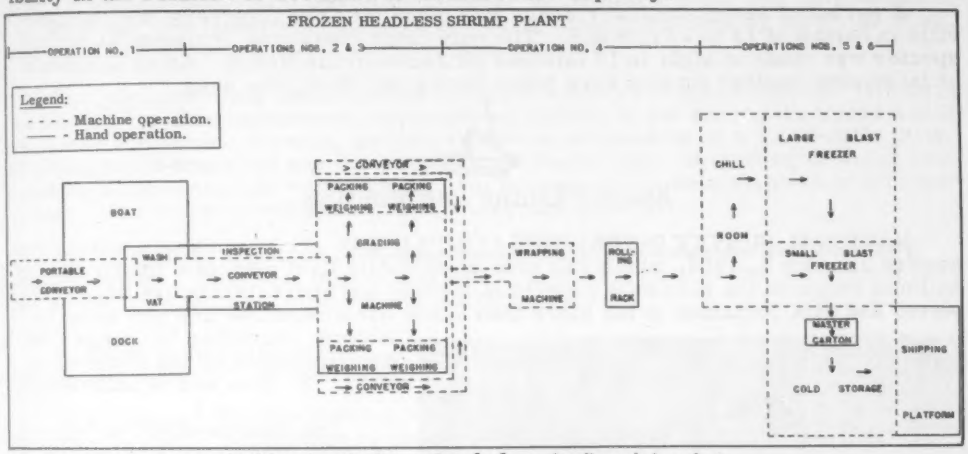
A balance must be struck between conserving ice and bathing the shrimp in the holds with water from the melting ice. Three inches of insulation on the hull and four inches on the deck and engineroom bulkheads appears to approximate this balance. An additional inch is recommended for steel hulls. Too heavily insulated holds will save on ice, but may result in the formation of "black spot" on the shrimp shell when the water film from melting ice is inadequate to reduce direct access to oxygen from the air.

The study was made by fishing methods and gear specialists E. Isaac Camber and Gordon C. Broadhead, employed by Harwell, Knowles & Associates, Coral Gables, Fla. It was financed by funds made available under the Saltonstall-Kennedy Act of 1954.

* * * * *

IMPROVED PLANT LAYOUT CAN CUT COSTS IN FROZEN SHRIMP PACKING PLANTS: Frozen shrimp packing costs can often be cut by modifying plant layout. Man-hours required to perform substantially the same operation vary as much as 90 percent between plants, according to an engineering survey in the Gulf Area made by the First Research Corporation of Miami, Fla., under the supervision of the U. S. Fish and Wildlife Service. The survey was financed by funds made available under the Saltonstall-Kennedy Act of 1954.

In a special study of freezer-room facilities, the engineers found that more economical operation resulted from dividing the freezing area into large and small freezing rooms. This arrangement, with a prechilling area, provides greater flexibility in the relation of workload to total freezer capacity.



Model engineering layout plan of a frozen headless shrimp plant.

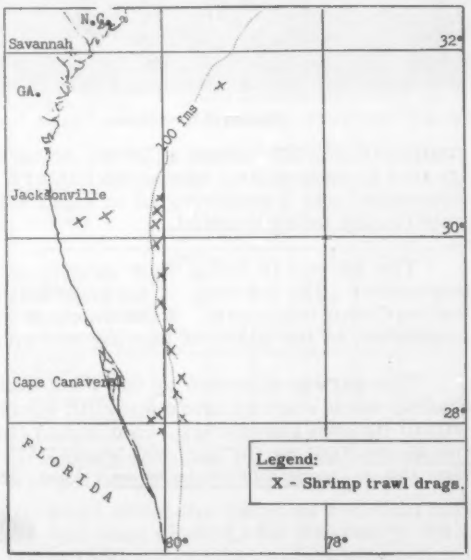
A synthesized plan for a model plant layout (see schematic diagram) was developed for maximum efficiency using equipment and machinery in common use in the industry. In many cases, the adoption of some phase only of the synthesized layout plan offers real savings in man-hour costs.

South Atlantic Exploratory Fishery Program

DEEP-WATER RED SHRIMP CAUGHT BY "PELICAN" (Cruise 2): In April, deep-water exploratory shrimp trawling by the exploratory fishing vessel Pelican extended from Cape Canaveral to off Savannah in depths of 138 to 250 fathoms. All drags were made with a 40-foot flat shrimp trawl using a single trawling warp and bridle. The Pelican is under charter by the U. S. Fish and Wildlife Service and is exploring for deep-water shrimp with funds provided by the Saltonstall-Kennedy Act of 1954.

Between Cape Canaveral and St. Augustine seven 4-hour drags in depths of 150 to 212 fathoms caught 20-30 count red shrimp at rates of about 40 pounds a drag. The largest catch (70 pounds) was made in 150 to 156 fathoms off False Cape, Fla.

North of St. Augustine increasingly rough bottom was encountered. Three of four drags made off Jacksonville resulted in gear damage and no shrimp catch. The other drag caught 45 pounds of 16-20 count red shrimp.



Location of shrimp trawl drags by the Pelican during Apr. 1956.

A depth-recorder survey in deep water from Jacksonville to Savannah revealed apparently untrawlable bottom. Off Savannah a clear spot was located in 182 to 250 fathoms and a 1-hour drag caught 13 pounds of red shrimp.

A series of seven shallower drags was made off Cape Canaveral and Jacksonville in depths of 13 to 26 fathoms. The only catch containing commercial shrimp species was made at night in 13 fathoms off Jacksonville Beach. About $1\frac{1}{2}$ pounds of large pink-spotted shrimp were taken during the 40-minute drag.

Sport Fishing and Hunting

NATIONAL SURVEY INTERVIEWS COMPLETED: Field work on a survey that started January 7, 1956, which will give America its first authentic information of national scope on the economic aspects of hunting and sport fishing has been completed and data contained in the more than 9,000 questionnaires are now being analyzed, according to an April 20 announcement by the Director of the U. S. Fish and Wildlife Service.

Opening of trout season.

The results of the survey will be submitted to the Fish and Wildlife Service this summer in time to permit preparation of a detailed report for presentation at the September meeting of the International Association of Game, Fish and Conservation Commissioners. Printed copies of the Service report will be available at that time.

The survey under the direction of the Fish and Wildlife Service was made by the Crossley, S-D Surveys, Inc., of New York, successful bidder from among nine firms which submitted proposals for the task. Two hundred Crossley interviewers, working with a sample of 15,000 homes selected scientifically throughout the country with some located in each state, contacted hunters and fishermen in 5,200 homes. The questionnaire form was pretested in eight widely-separated sections of the country before finally being adopted.

The survey is being done largely as the result of a resolution adopted at the September 1954 meeting of the International Association of Game, Fish and Conservation Commissioners. Wildlife conservationists generally have felt the need for evaluation of the place of hunting and sport fishing in the national economy.

The survey directed by the Fish and Wildlife Service is national in scope. Eight States, each wanting more specific economic information about hunting and fishing within its own boundaries, contracted for special state surveys which were made at the same time as the national study.

Note: Also see Commercial Fisheries Review, February 1956, p. 31; July 1955, p. 39.

Tuna Fishery

MID-PACIFIC UPWELLING EFFECT ON TUNA FISHERY STUDIED BY SERVICE: A greater than usual upwelling of water in the mid-Pacific and its possible effect upon the tuna fishery of that area are being closely watched by the U. S. Fish and Wildlife Service, a May 8 news release reported.

The huge upwelling has occurred along the equator, south of Hawaii. The Service is studying the temperature and chemical content of the water, the speed and direction of the ocean currents, and the abundance of plankton in a 1,000-mile strip of ocean which spans the equator southeast of the Islands. Upwelling of water is a common occurrence along the equator, but because of the potentialities of this particular action Service scientists felt it warranted attention.

The upwelling is caused by displacement of surface water by the prevailing easterly winds. This sets up vertical currents which result in the transfer of fertile water from the cool depths to the surface of the sea.

Because of its fertility, the "new" water has the ability to produce and maintain an extraordinary abundance of plankton.

The Fish and Wildlife Service has made two special studies, one on the equator and the other at 1° N. latitude to discover the speed at which the sea water was flowing away from the area of the upwelling. In this work, drags were hung deep in the water from floats which were followed and checked for speed and direction.

The objective of the study is to find out where the drifting mass of fertile water, with its cargo of developing plant food, will be when it becomes a good tuna feeding ground.

Service officials believe that if this objective is achieved, predicting the location of a good tuna-fishing area will be possible.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, FEBRUARY 1956: United States imports of edible fresh, frozen, and processed fish and shellfish for February decreased about 15 percent in quantity and 9.6 percent in value as compared with January 1956, but were higher by 11 percent in quantity and 31.6 percent in value than for February 1955. The dollar value in February 1956 was close to 29 cents a pound, compared with 24.4 cents a pound in February 1955. Shrimp imports were about 2.7 million pounds higher in February 1956 when compared with February 1955 and this increase will account for most of the increase in value, according to a U. S. Department of Commerce summary (see table).

United States Foreign Trade in Edible Fishery Products, February 1956 with Comparisons

Item	Quantity			Value		
	Feb.		Year	Feb.		Year
	1956	1955	1955	1956	1955	1955
	(Million of Lbs.)			(Millions of $)		
Imports:						
Fish & Shellfish: Fresh, frozen & processed 1/	61.8	55.7	768.3	17.9	13.6	206.4
Exports:						
Fish & Shellfish: processed 1/ only (excluding fresh & frozen)	6.8	6.8	91.0	1.5	1.5	21.8

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

Exports of processed fish and shellfish in February 1956 decreased about 37.5 percent from the January 1956 total, but were about the same as for February 1955. The value of exports in February 1956 was also close to the February 1955 value, but was down 28.6 percent from January 1956.

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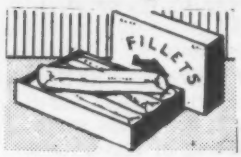
GROUNDFISH FILLET IMPORTS UP IN APRIL: United States imports of groundfish (including ocean perch) fillets during April 1956 totaled 11.9 million pounds compared with nearly 11.0 million pounds imported during April of last year. This was a gain of 8 percent. The primary cause for the gain was a 3.5-million-pound increase in imports of groundfish and ocean perch fillets from Iceland. Increases of lesser importance were also noted for Norway, the Netherlands, and Miquelon and St. Pierre. Imports of groundfish fillets from Canada, Denmark, the United Kingdom, and West Germany were somewhat lower during April of this year than during the same month of 1955. France, Greenland, and the Union of South Africa exported groundfish fillets to the United States during April 1956 but did not export any during the corresponding month of last year.

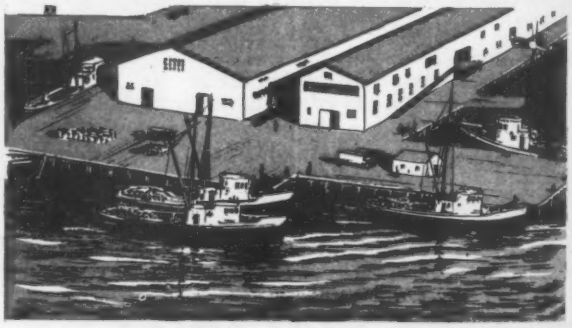


Canada continued to lead all other countries exporting groundfish and ocean perch fillets to the United States with 5.9 million pounds during April 1956--49 percent of the groundfish fillets imported during that month. Iceland was in second place with 4.5 million pounds.

Total groundfish and ocean perch fillet imports into the United States during the first four months of 1956 amounted to 50.1 million pounds. This was 6 percent more than the quantity imported during the corresponding period of last year. Canada, with 31.4 million pounds, led all other countries exporting fillets to the United States during that period, followed by Iceland (13.9 million pounds) and Norway (2.1 million pounds).

* * * * *

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, APRIL 1956: United States imports of frozen tuna during April and the first four months of 1956 were less than the same period a year ago, but canned tuna imports were larger. Frozen albacore imports during January-April this year were 27 percent less than a year earlier while imports of other frozen tuna gained 15 percent. Canned albacore imports were 16 percent greater and other canned tuna imports 5 percent over those for the comparable four-month period a year earlier. For the first four-months of 1956, 45.1 million pounds of frozen tuna were imported as compared with more than 50 million pounds in the similar period of 1955; almost 10.7 million pounds of canned tuna were received as compared with 9.8 million pounds a year earlier.



Imports of groundfish fillets in April 1956 and for the first four months of 1956 were larger than during the corresponding periods of 1955. However, a substantial drop occurred in imports of fillet blocks and slabs, which was more than compensated by an increase in ordinary fillets. Imports of haddock, hake, pollock, and cusk fillets totaled 15.9 million pounds for the first four months of 1956, an increase of 54 percent over the same 1955 period; imports of cod fillets likewise gained 28 percent and totaled 15.4 million pounds. Imports of fillet blocks and slabs January-April 1956 were 40 percent less than for the same period in 1955.

Imports of shrimp in the first four months of 1956 were 80 percent larger than the previous year--22.8 million pounds as compared with 12.7 million pounds. A small increase was shown in imports of lobster which totaled nearly 14 million pounds for the first four months of 1956--a small increase over a year earlier.

Fish meal imports were greater for both April and the first four months this year than for the same period the previous year. Imports during April amounted to 12.7 million pounds; January-April 1956 imports totaled 40.1 million pounds, 9 percent above a year ago for that period.

Canned salmon imports totaled 3.3 million pounds in April and 9.7 million pounds for the first four months of 1956. This compared with slightly over 1 million pounds imported during January-April 1955.

United States exports of canned salmon January-April 1956 totaled only 0.5 million pounds as compared with 3.9 million in the same period of 1955. Exports of canned sardines totaled 19.4 million pounds--18 percent greater. Fish oils exported totaled 41.6 million pounds, about the same as in the comparable four months a year ago.

Veterans' Hospitals Consumption of Fish

An estimated total of 1,378,812 pounds of fresh and frozen fish and 710,386 pounds of canned fish were purchased by the U. S. Veterans' Administration Hos-

Table 1 - Amount of Fresh and Frozen Fish Purchased by Veterans' Administration Hospitals, October 1954-September 1955

Species	Northeast		North Central		South		West		Total	
	Total Quantity	Avg. Cost Per Lb.	Total Quantity	Avg. Cost Per Lb.	Total Quantity	Avg. Cost Per Lb.	Total Quantity	Avg. Cost Per Lb.	Total Quantity	Avg. Cost Per Lb.
	Lbs.	$	Lbs.	$	Lbs.	$	Lbs.	$	Lbs.	$
GROUNDFISH:										
Ocean perch	69,544	.30	87,840	.26	99,816	.28	17,628	.28	274,028	.28
Haddock	97,684	.30	54,280	.26	58,428	.29	13,564	.30	223,956	.29
Cod	37,484	.28	37,204	.25	24,460	.29	21,912	.27	121,060	.27
Other (pollock, hake, and cusk)	35,496	.24	-	-	4,800	.22	-	-	40,296	.24
Total Groundfish	240,208	.29	179,324	.26	187,504	.28	53,104	.28	660,140	.28
OTHER:										
Flounder	51,568	.42	25,760	.42	49,344	.42	18,924	.26	145,596	.40
Halibut	28,320	.40	53,112	.33	24,056	.35	39,608	.30	145,096	.34
Salmon	25,664	.65	22,732	.41	5,156	.42	30,944	.39	84,496	.47
Sea bass	868	.42	-	-	13,628	.39	32,424	.33	46,920	.35
Catfish	-	-	12,432	.32	23,608	.40	4,372	.32	40,412	.37
Mackerel	24,348	.27	-	-	15,308	.37	-	-	39,656	.31
Whiting	17,724	.30	6,620	.27	10,020	.19	-	-	34,364	.26
Red snapper	-	-	-	-	18,844	.52	15,456	.29	34,300	.42
Pike	204	.55	24,268	.41	-	-	-	-	24,472	.42
Swordfish	11,092	.43	-	-	1,616	.59	10,280	.31	22,988	.39
Corvina	-	-	-	-	-	-	18,440	.28	18,440	.28
Rockfish	-	-	-	-	720	.52	15,200	.29	15,920	.30
Trout	-	-	1,420	.40	11,464	.30	-	-	12,884	.31
Smelts	4,012	.34	392	.27	-	-	3,084	.34	7,488	.34
Drumfish	-	-	-	-	5,600	.38	-	-	5,600	.38
Bluefish	5,572	.38	-	-	-	-	-	-	5,572	.38
Whitefish	516	.52	4,616	.49	168	.45	-	-	5,300	.50
Scup	-	-	-	-	5,212	.17	-	-	5,212	.17
Croaker	-	-	-	-	4,924	.35	-	-	4,924	.35
White bass	-	-	3,300	.33	-	-	-	-	3,300	.33
Yellow perch	-	-	2,904	.63	-	-	-	-	2,904	.63
Tortuava	-	-	-	-	-	-	2,600	.34	2,600	.34
Butterfish	2,412	.31	-	-	-	-	-	-	2,412	.31
Herring	-	-	-	-	2,200	.12	-	-	2,200	.12
"Deep sea white"	1,516	.38	-	-	-	-	-	-	1,516	.38
Mullet	-	-	-	-	1,308	.31	-	-	1,308	.31
Woldfish	-	-	1,244	.36	-	-	-	-	1,244	.36
Barracuda	-	-	-	-	-	-	904	.38	904	.38
Ling cod	-	-	-	-	-	-	484	.26	484	.26
Fresh-water fish	160	.70	-	-	-	-	-	-	160	.70
Total Other Fish	173,976	.41	158,800	.38	193,176	.38	192,720	.31	718,672	.37
Total Fresh and Frozen Fish	414,184	.34	338,124	.31	380,680	.33	245,324	.31	1,378,812	.33

pitals during October 1954 through September 1955. (Shellfish purchases are not included.)

FRESH AND FROZEN FISH: In all, 35 species of fresh and frozen fish were purchased, with ocean perch and haddock fillets accounting for better than one-third (36 percent) of the total quantity bought. Six species of groundfish (cod, haddock, ocean perch, pollock, cusk, and hake), as a group, accounted for almost half (660,000 pounds) of the purchases.

Although the total pounds of fresh and frozen fish purchased accounted for 56 percent of all fishery products purchased by these hospitals, the estimated expenditure of $448,561 for fresh and frozen fish represents only two-fifths (42 percent) of the total dollars expended by these hospitals for all fishery products during the survey period. The average cost per pound of fresh and frozen fish was $0.33, ranging from a low of $0.12 for fillets of lake herring to a high of $0.70 per pound for assorted fresh-water fillets.

Table 2 - Annual Per Capita Consumption of Fresh and Frozen Fish in Veterans' Hospitals, Oct. 1954-Sept. 1955

Region	Average No. of Patients	Groundfish (Incl. Ocean Perch)	Other Fresh or Frozen Fish	Total
		(Pounds)		
Northeast	28,686	9.00	6.52	15.52
North Central	29,340	6.11	5.41	11.52
South	34,040	5.51	5.67	11.18
West	15,681	3.39	12.29	15.68
Total	105,747	6.24	6.80	13.04

Regionally, Veterans' Administration Hospitals located in Northeast (see table 2) purchased the greatest total number of pounds of fresh and frozen fish while those in the West purchased the smallest quantity. Veterans' Administration Hospitals in the West, however, served more pounds of fish per patient than did hospitals in other regions. It is interesting to note, in this connection, that the average yearly consumption per patient in the Northeast and West were both significantly higher than the averages in either the North Central or South.

These findings are based on a mail inquiry of a sample of 105 Veterans' Administration Hospitals located throughout the United States. Included in this study were all Veterans' hospitals averaging a thousand or more patients, and a systematic random sample of hospitals with an average patient load of less than a thousand during the survey period.

Table 3 - Canned Fish Issued to Veterans' Administration Stations, Oct. 1954-Sept. 1955

	Quantity (1,000 Lbs.)
BY SPECIES:	
Salmon:	
Red	300.2
Chum	102.8
Total Salmon	403.0
Tuna	227.0
Sardines	80.4
Grand Total	710.4
BY AREAS:	
East (Somerville, N. J.)	283.7
North Central (Hines, Ill.)	335.7
West (Wilmington, Calif.)	91.0
Grand Total	710.4

CANNED FISH: Over 700,000 pounds of canned fish were issued to Veterans' Administration Stations from October 1954 through September 1955. More than half (57 percent) of the canned fish issued was canned salmon and almost three-fourths of this was of the red variety.

Of the total pounds of canned fish issued, canned tuna accounted for approximately one-third and sardines for one-tenth.

The effect of seasons on canned fish issued is not too distinct. The quantity of salmon issued throughout the year was relatively stable, while sardines show a definite high point in the summer months (July-September). On the other hand, over half of the canned tuna was issued during the fall and winter months (October through March).

Washington

PROGRAM FOR REMOVAL OF SCRAP FISH, 1955/56: Otter trawlers in southern Puget Sound removed 1,094,870 pounds of scrap fish and sole infested with parasites during the four-month season ended March 31, the Washington State Department of Fisheries announced on April 23, 1956. This is part of a program by the State to remove predatory dogfish populations and eliminate parasitized sole in order to improve the catch of marketable fish.

The landings included 494,870 pounds of dogfish, ratfish, skate, octopus, and hake, and 600,000 pounds of English sole infested with parasites fit only for reduction to fish meal or for use as animal food.

The total food-fish catch of marketable sole, true cod, flounder, and other species totaled 182,600 pounds, evidence that the opening of the southern Puget Sound area and Hood Canal after long closure is increasing the proportion of marketable fish. The food-fish catch in 1954/55 was only 72,435 pounds.

During the first season (1953/54), the reopened areas produced a catch of 2,042,000 pounds of scrap fish and a food-fish catch of 248,000 pounds in southern Puget Sound waters. The 1955/56 special season on Hood Canal resulted in a scrap fish take of only 13,700 pounds as against 584,900 pounds in 1954/55.

The reduction in landings of scrap fish is regarded as significant progress toward restoration of the areas for food-fish production.

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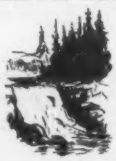
STATE FISH HATCHERIES TO PLANT RECORD NUMBER OF SALMON IN 1956: The 19 salmon hatcheries and rearing stations of the Washington State Department of Fisheries will release close to 33.5 million salmon fingerlings and yearlings in 1956, according to an announcement made on April 17.

More than 4 million of the baby salmon will be marked in various ways for experimental purposes.

The planting program is one of the largest involving reared fish in the Department's history. It will involve 24.2 million fingerlings and 9.3 million yearlings (including 23,440,000 fall chinook, 529,000 spring chinook, 8,676,000 silver, 520,000 pink, 250,000 chum, 46,000 sockeye, and 29,000 steelhead).

Puget Sound district hatcheries will be making the most plants, with a total of 17.3 million of all species. The Columbia River district is next, with a total 12.1 million. Willapa Harbor and Grays Harbor hatcheries will release 4.1 million.



Wholesale Prices, May 1956

During May 1956 the over-all wholesale index for all edible fish and shellfish (fresh, frozen, and canned) increased 3 percent over that for April 1956 (111.7 percent as compared with 108.6 percent of the 1947-49 average). The index for May 1956 was also higher by 14 percent when compared with May 1955. Changes in the indexes during May 1956 were due primarily to higher prices for the drawn, dressed, or whole finfish subgroup.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, May 1956 with Comparisons

Group, Subgroup, and Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49 = 100)			
			May 1956	Apr. 1956	May 1956	Apr. 1956	Mar. 1956	May 1955
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					111.7	108.6	113.1	98.1
Fresh & Frozen Fishery Products:					120.6	115.2	120.6	97.9
Drawn, Dressed, or Whole Finfish:					113.3	100.5	114.6	85.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.07	.05	70.9	50.1	78.5	57.6
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	"	.40	.34	123.8	106.2	98.0	68.1
Salmon, king, lge.& med., drsd., fresh or froz.	"	"	.63	.61	140.5	137.1	137.6	111.8
Whitefish, L. Superior, drawn, fresh	Chicago	"	.62	.69	153.7	171.0	204.5	141.3
Whitefish, L. Erie pound or gill net,rnd.,fresh	New York	"	.74	.60	148.6	121.3	161.8	146.6
Lake trout, domestic, No. 1, drawn, fresh	Chicago	"	.51	.54	104.5	110.6	168.0	96.3
Yellow pike, L. Michigan & Huron,rnd.,fresh	New York	"	.29	.21	68.0	49.3	123.1	93.8
Processed, Fresh (Fish & Shellfish):					126.1	126.6	126.5	108.5
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.27	.24	91.9	81.7	102.1	85.1
Shrimp, lge.(26-30 count),headless, fresh or froz.	New York	"	.79	.79	124.8	124.8	120.9	108.6
Oysters, shucked, standards	Norfolk area	gal.	5.50	5.62	136.1	139.2	139.2	114.4
Processed, Frozen (Fish & Shellfish):					115.2	114.3	112.3	95.6
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	103.4	103.4	102.1	99.5
Haddock, sml.,skins on,1-lb. pkg.	"	"	.29	.29	91.0	91.0	91.0	80.0
Ocean perch, skins on, 1-lb. pkg.	"	"	.29	.29	114.8	114.8	114.8	106.7
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	"	.76	.76	118.1	116.5	113.0	91.0
Canned Fishery Products:					99.0	99.2	102.4	98.3
Salmon, pink, No.1 tall (16 oz.), 48 can/cs.	Seattle	case	21.27	21.27	120.0	120.0	120.0	109.6
Tuna, lt.meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 can/cs.	Los Angeles	"	10.60	10.70	76.4	77.1	85.1	90.1
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	" "	"	7.50	7.38	87.5	86.1	83.2	88.1
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	"	8.45	8.45	89.9	89.9	89.9	71.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

The May 1956 index for the drawn, dressed, or whole finfish subgroup increased 12.7 percent from April 1956 and was higher by 32.4 percent as compared with May 1955. Prices for haddock at Boston increased from the seasonally low April 1956 level and frozen halibut prices continued to move upward due to light supplies. The May 1956 indexes for haddock and halibut were higher by 23.1 and 81.8 percent, respectively, as compared with May 1955. All other items in this subgroup for May 1956 were higher when compared with May 1955 except for yellow pike, which was lower by 27.5 percent.

The fresh processed fish and shellfish subgroup index in May 1956 was down slightly as compared with April 1956, however it rose 16.2 percent when compared with May 1955. Higher ex-vessel costs for fresh drawn haddock were

reflected in the increase in fresh haddock fillets (up 12.5 percent). Fresh shrimp prices were steady from May to April 1956 but the index value for May 1956 was up about 19 percent compared with the same month a year ago.

The May 1956 index for the frozen processed fish and shellfish subgroup was higher by less than 1 percent as compared with April 1956, but increased sharply by 20.5 percent when compared with May 1955. The May 1956 index for the frozen fillets that make up this subgroup increased close to 8 percent and frozen shrimp was higher by 30 percent when compared with May 1955.

Display case for fishery products.

The canned fishery products subgroup index for May 1956 was about unchanged from April 1956 and less than 1 percent above the index for May 1955. Increases in 1956 prices of canned pink salmon and Maine sardines were offset by a 15.2 percent decrease in canned light meat tuna from May 1955 to May 1956.

UNUSUAL METHOD FOR CATCHING MULLET

An unusual and interesting but efficient method for catching mullet is used in Malta.

A large raftlike structure, composed of canes bound together, is built to conform to the width of the place where it is to be used, usually the mouth of a creek. This is anchored across the entrance of the creek by its four corners, and a vertical wall of netting is hung from the side heading towards the creek. Several men in boats pass up the creek beyond the raft; then fishing begins. The men come downstream towards the raft, beating the water, splashing frantically, and in general making as much noise as possible, driving the mullet before them. This species, one of the best jumpers among fish, cannot pass the wall of webbing, but many attempt to leap over the obstruction. Their leap sends them onto the raft which has much loose straw and branches of trees to prevent further leaps of the fish. The fish are then gathered up and carried off to market, where they are much esteemed.

--Sea Secrets, The Marine Laboratory, University of Miami, Coral Gables, Fla.

FOREIGN

International

NORTHWEST ATLANTIC FISHERIES COMMISSION

FISHERIES TRENDS IN NORTHWEST ATLANTIC CONVENTION AREA: Canada: The 1955 cod landings of Canada from the Northwest Atlantic area were smaller than those of 1954, but higher than in 1953. The decline was most pronounced for the Newfoundland area, amounting to almost 25 percent, and a corresponding decline in the production of salt cod occurred. Haddock landings both from Subarea 3 and 4 continued to increase. The increase of the haddock landings continued in January and February 1956 and in these two months were twice as high as in the same months in 1955.

The regulations of mesh sizes in nets used by trawlers and draggers, recommended by ICNAF were announced as going into effect for the Canadian trawlers and draggers on January 1, 1957, reports the Commission's Newsletter of May 15.

New excellent cod fishing grounds have been discovered off the east coast of Newfoundland as the result of long-lining experiments carried out for the Research Board of Canada by the Biological Station in St. John's. The grounds extend from the northern edge of the Grand Bank to beyond the Strait of Belle Isle, spreading over an area of 10-60 miles offshore.

France: The French frigate l'Aventure will carry out its usual campaign in the Northwest Atlantic area from March to October, i. e. during the main fishing season for the French trawler fleet. Although the main purpose is to assist the fishermen, hydrographical and meteorological observations will be made. l'Aventure will visit Subareas 1, 2, 3, and 4.

United States: The U. S. A. explorations for new fishing areas for ocean perch were continued in December, to the east of the Laurentian Channel. The largest single ocean perch catch (2,000 pounds) was made south of St. Pierre Bank at a depth of 225 fathoms. The research was impeded by bad weather conditions.

Norway: The modern Norwegian fishing vessel Senior landed in December 1955 in England 70 tons of line-caught halibut from West Greenland waters. This landing is additional evidence of the renewed Norwegian interest in the fishery for halibut in Subarea 1, and furnishes a further incitement to the international research work on West Greenland halibut planned by the ICNAF Panel 1.

1956 Campaign of the European Cod Fishing Fleets: In the middle of January the first Spanish trawlers (PYSBE) left for the Newfoundland area, towards the end of the month they were followed by others (COPIBA). It is expected that the number of trawlers will be a little larger than last year; the number of vessels will in the near future be increased by several new units; the building of further units is

planned. The Spanish fishing fleet is in a few years hence supposed to be able to saturate the Spanish market with salt cod.

In the first half of February Spanish pair trawlers left for Subarea 3.

Around the middle of February a number of French trawlers left Fecamp for the Grand Banks of Newfoundland.

February 15 and 17 the two large Italian trawlers Genepesca I and Genepesca II sailed from Livorno for their first trip of 1956 to the Grand Banks and the West Greenland Banks.

During February most of the Portuguese trawlers left for the Convention Area. About 22 trawlers, nearly the same number as last year, will fish in the Northwest Atlantic in the 1956 campaign.

In the beginning of March the Portuguese dory vessels left their home ports on their way to the Convention Area. Some 50 dory vessels will be fishing cod in that area this year, among them several newly-constructed units.

Up to April about 20 Norwegian vessels had left for the West Greenland fishing banks.

The Greenland Department of the Danish Government has had a new research-fishery vessel (Sujumit) of the cutter-type constructed for experimental fishing in Greenland waters. The main work of this vessel will be the trying of new fishing methods, the exploration of fishing banks, and the locating of fish shoals. During 1956 it will start work in Greenland waters. Together with another cutter of the Greenland Department it will carry out experimental fishing with pair-trawl.

The first results of the Spanish fishery on the Grand Bank this year have been highly satisfactory, especially the pair-trawlers which have reported exceedingly good yields. Some of them are reported to have left the Banks with full loads either for Vigo (Spain) or for St. Pierre et Miquelon.

UNITED NATIONS TECHNICAL ASSISTANCE BOARD

PROPOSALS FOR FUTURE EXPANDED PROGRAM OF TECHNICAL ASSISTANCE: The United Nations Technical Assistance Board released on May 18 a report outlining proposals for possible future development of the Expanded Program of Technical Assistance based on a review of the experience gained in the first six years of that Program's operation.

Summarizing activities under the Program since 1950, the report ("The Expanded Program of Technical Assistance: A Forward Look," Doc. E/2885) points out that 78 countries have pledged a total of US$142 million for the financing of the Program; that some 131 countries and territories have been helped at one time or another; and that 77 countries have supplied experts to the Program while 105 countries and territories have provided training facilities.

"It may safely be said," observes the report, "that never before have the resources of so many countries been mobilized for a world-wide, cooperative enterprise."

Turning to the future, the report suggests that two possible levels of expansion might be considered; the first "involving a modest increase in resources to finance limited expansion of activities within the present scope of the Program;" the second, "looking forward to a much more far-reaching extension of the work."

It suggests that to achieve the "limited advance" embodied in the first possibility, a target figure of US$50 million for the annual income of the Program might be set, to be approached in stages over the next few years. The report stresses, however, that this would do no more than enable the participating organizations "to maintain the momentum of present activities within the existing scope of the Program and to meet the more urgent requests of newcomers."

For the more substantial expansion envisaged in the second possibility foreseen by the Board, the report states "it would be too theoretical an exercise to make any estimate of the sum needed ... in the absence of guidance from the Technical Assistance Committee concerning the realistic limits which should govern the calculation." It indicates, however, that it would call for resources "many times the size of those now available."

Among the specific suggestions included under "Agricultural Research and Demonstration Projects" is:

"(v) fisheries could be made much more effective if full operational projects were developed, combining the initial survey with the provision of mechanized fishing boats and of cold-storage plants for effective distribution of increased supplies."

JAPAN-U.S.S.R. REACH AGREEMENT ON PACIFIC SALMON FISHING

Japanese fishermen can begin fishing for salmon in the Northwest Pacific immediately, according to an interim agreement in the form of an exchange of notes reached on May 15 between Soviet Russia and Japan covering the 1956 salmon fishing season. According to reports from Moscow, a Japanese spokesman indicated that since the exchange of notes is as binding as a treaty it permits Japanese fishermen to enter restricted zones off the Soviet Asian coast and fish for salmon. The agreement was the result of negotiations between the Soviets and a Japanese mission which left Japan on April 13, 1956.

An official Soviet Russian radio announcement on March 21 from Moscow stated that salmon fishing in the area of the entire Okhotsk Sea, the western portion of the Bering Sea, and the Northwest Pacific would be restricted between May 15 and September 15, 1956. The March 21 regulations also restricted the salmon catch to 50,000 tons or about 25 million fish. However, the exchange of notes raises the annual salmon catch for Japanese fishermen to 65,000 tons, according to a Japanese spokesman.

In addition to the interim salmon-fishing agreement, the Russian and Japanese ministers at the same time signed a 10-year fisheries treaty and a 3-year sea-rescue agreement. Both of these agreements will go into effect when the Russo-Japanese peace treaty is negotiated.

A release for the U. S. Information Service, Tokyo, states:

"1. Official note concerning regulatory measures for fishing operations in the territorial area of each nation:

> "This indicates an understanding reached between both governments that they should take necessary measures for conservation of fish resources in their respective countries, parallel with their joint steps on the high seas.

"2. Official note on an understanding that the provisions of Article 2 of the sea-rescue agreement will not affect the stand of the signatory nations on the scope of territorial waters.

"3. Official note pertaining to provisional measures on the salmon fishing for this year:

"This shows an understanding that Japanese fishermen will be allowed to catch 65,000 tons of salmon during this year's fishing season in the restricted area declared by the Soviet Council of Ministers.

"In addition a letter ... wasattached, saying that approval by the Japanese Diet is required."

JAPAN-U.S.S.R FISHERIES TREATY

On May 15, 1956, a long-range agreement was reached between Japan and the Union of Soviet Socialist Republics regarding the fisheries on the high seas in the North Pacific Ocean. This long-range treaty will enter into force on the effective date of a peace treaty between Japan and the U. S. S. R. or on the date of resumption of diplomatic relations.

Fishing in the North Pacific area during the 1956 season is governed by another agreement reached specifically for the 1956 season (see preceding article).

The text of the long-range treaty follows:

TREATY--BETWEEN JAPAN AND THE UNION OF SOVIET SOCIALIST REPUBLICS CONCERNING FISHERIES ON THE HIGH SEAS IN THE NORTH PACIFIC OCEAN

The Government of Japan and the Government of the Union of Soviet Socialist Republics, having a common interest in the development of fisheries on a rational basis in the Northwestern Pacific, and taking into consideration their mutual responsibilities regarding conditions of the fish species and other marine animal resources and their effective utilization:

In recognition of their agreement that the maintenance of the maximum sustained productivity of fisheries in the Northwestern Pacific is of common benefit to mankind and the two Signatory Powers;

Considering that each Signatory should assume the duty on a free and equal basis to plan for the preservation and increase of the above described resources;

The two Signatories, recognizing that it is highly desirable to promote and coordinate scientific research for the purpose of maintaining maximum sustained productivity in the fisheries with which the two Signatories are concerned;

Have, therefore, decided to conclude this Treaty and have respectively appointed Representatives for this purpose. These Representatives have agreed as follows:

Article I

1. The area to which this Treaty applies (hereinafter called "Treaty Area") shall be the entire waters (excluding territorial waters) of the Northwestern Pacific Ocean, including the Japan Sea, the Sea of Okhotsk, and the Bering Sea.

2. It shall be understood that no provisions of this Treaty shall affect in any way whatsoever the position of the Signatories as regards the extent of the territorial waters and their jurisdiction over fisheries [therein?].

Article II

1. Both Signatories agree, for the preservation and development of fish and other marine animal resources (hereinafter to be called "fishery resources"), to adopt for the Treaty Area the joint measures indicated in the Appendix 1/ to this Treaty.

2. The Appendix 1/ to this Treaty shall be considered as constituting an inseparable part of the Treaty. The word "Treaty" shall be understood to include this Appendix 1/ in its present wording or as amended in accordance with Paragraph (a) of Article IV.

Article III

1. In order to fulfill the objectives of this Treaty, both Signatories shall establish a Japanese-Soviet Fisheries Commission (hereinafter called "Commission").

2. The Commission shall be comprised of two National Committee Divisions; each National Committee Division shall consist of three Commissioners appointed by the Governments of the respective Signatories.

3. All resolutions, recommendations, and other decisions of the Commission shall be made only upon agreement between the National Committee Divisions.

4. The Commission shall determine the rules for the conduct of meetings and may revise them whenever necessary.

1/ Not available at present.

5. The Commission shall meet at least once annually and in addition may meet at the request of the Nationality Committee Division of either party. The date and place of the first meeting shall be determined by agreement between the two Signatories.

6. The Commission shall at its first meeting select a Chairman and a Vice Chairman from the two different National Committee Divisions. The Chairman and the Vice Chairman shall be selected for a term of one year. The selection of the Chairman and the Vice Chairman from the National Committee Divisions shall be accomplished in such a way that each year each Signatory shall be represented in these positions on a rotation basis.

7. The official languages of the Commission shall be Japanese and Russian.

8. The expenses incurred by the Commissioners in attending Commission meetings shall be defrayed by the appointing government. The Commission shall pay the joint expenses of the Commission in accordance with the allotted charges to be borne by the two Signatories as advised by the Commission after the formality of approval and allocation by the two Signatories.

Article IV

The Commission shall carry out the following duties:

(a) At the meeting following regular annual meetings, joint measures which are being enforced at the time shall be examined for their appropriateness and, if necessary, the Appendix to this Treaty may be amended. These amendments shall be determined on a scientific basis.

(b) If, in accordance with the Appendix, a fish species requires determination of the total annual catch, the Commission shall determine the amount of annual catch for the said fish species for both Signatories and report the figure to the two Signatory Powers.

(c) In implementing this Treaty, the Commission shall determine the kind and scope of statistics and other data which each Signatory shall submit to the Commission.

(d) The Commission shall draw up and coordinate joint scientific research programs for the purpose of studying fishery resources and shall recommend these to the two Signatories.

(e) It shall submit annually to both Signatories a report of the activities of the Commission.

(f) Besides the duties indicated in the previous sections, the Commission may make recommendations to the two Signatories on problems dealing with the preservation and increase of fishery resources within the Treaty Area.

Article V

In order mutually to exchange experiences concerning fishery regulation and the study and preservation of fishery resources, both Signatories agree to carry out an exchange of men of science with experience in fisheries. These exchanges of persons shall be carried out upon agreement by the two parties for each such occasion.

Article VI

1. The two Signatories shall take appropriate and effective measures to carry out this Treaty.

2. When a Signatory receives notification from the Commission relative to the amount of the total annual catch as determined for the Signatory in accordance with Paragraph (b) of Article IV, it shall issue licenses or certificates to fishing vessels on this basis, and the two Signatories shall notify each other concerning the issuance of all such licenses and certificates.

3. The licenses and certificates to be issued by the two Signatories shall be written in both Japanese and Russian and shall always be carried aboard when the fishing vessel is in operation.

4. In order to make the provisions of this Treaty effective, the two signatories shall enact and enforce the necessary laws and regulations, with appropriate punishment for violations committed by their citizens, organizations, and fishing vessels; moreover, both agree to submit to the Commission a report on the measures taken by their own country concerning this matter.

Article VII

1. When an authorized official of either of the Signatory Parties has sufficient reason to believe that a fishing vessel of the other Signatory is actually in violation of the provisions of this Treaty, the said official may board and search the said fishing vessel in order to determine whether or not the fishing vessel is observing the provisions of this Treaty. If the ship's captain demands it, the aforesaid official must present his identification papers issued by the Signatory Government to which he belongs, which shall be written in Japanese and Russian.

2. The said official may seize the said fishing vessel or arrest an individual if he discovers facts proving violations of the provisions of this Treaty by the fishing vessel or by an individual on board, as a result of his search of the said fishing vessel.

In such case, the Signatory Power to which the said official belongs shall as soon as possible inform the other Signatory Power to which the aforesaid fishing vessel or individual belongs, of the seizure or arrest; if the two Signatories cannot agree upon a different location, the said fishing vessel or individual must be turned over as quickly as possible at the same location to an authorized official of the Signatory Power to which they belong. If, however, the said Signatory Power

which received the report is not able immediately to receive them, and if the other Signatory Power is requested, the Signatory Power which receives such request may place the said fishing vessel or individual under surveillance within its own territory, if this is mutually agreed to by the two Signatories.

3. Only the authorities of the Signatory Power to which the said fishing vessel or individual belongs may try cases arising in connection with this Treaty; furthermore, they shall have the authority to mete out punishment for these [violations]. Records and evidence proving violation shall as soon as possible be presented to the Signatory Power having the jurisdictional right to try the case.

Article VIII

1. This Treaty shall come into force on the effective date of a Peace Treaty between Japan and the Union of Soviet Socialist Republics or on the date of resumption of diplomatic relations.

2. Either of the Signatories may inform the other Signatory of its intention to abrogate this Treaty at any time after a period of ten years following the date on which this Treaty comes into force.

If such notification is given, this Treaty shall terminate one year after the date on which the abrogation notification was received by the other Signatory Power.

IN WITNESS WHEREOF, the undersigned Representatives have signed the present Treaty.

DONE at Moscow, in duplicate, in the Japanese and Russian languages, each text having equal authenticity, this [fifteenth] day of May, 1956.

For the Government of Japan:

For the Government of the Union of Soviet Socialist Republics:

FISH-PROCESSING TECHNOLOGISTS MEET AT ROTTERDAM

An international meeting of Fish Processing Technologists, sponsored by the Food and Agricultural Organization (FAO) Interim Committee on Fish Handling and Processing, was held at Rotterdam, Netherlands, June 25-29, 1956. The meetings were attended by technologists from member governments of F.A.O. and from non-member countries who wished to attend.

The chairman of the meeting was Dr. G. A. Reay of the United Kingdom and working committees were headed by F. Bramsnaes of Denmark, K. Bakken of Norway, Professor George Borgstrom of Sweden, and E. Heen of Norway who presented their reports on chilling and freezing of fish, fisheries products for tropical consumption, and prepackaged fisheries products.

A symposium was held during the meeting on the use of antibiotics, bacteriostatic ices and dips, brine-cooling, sea-water ice, scale and crushed ice, and fresh-fish quality assessment using organoleptic and objective methods.

Australia

PROSPECTS FOR TUNA FISHING INDUSTRY GOOD: The 84-foot former purse-seiner Tacoma obtained 30 metric tons of tuna on her first two trips as a tuna bait boat out of Port Lincoln, South Australia.

As reported in the Adelaide Advertiser, 10 tons were taken on the second 8-day trip which struck bad weather.

On the way back to port the Tacoma ran into two eagerly-biting schools of tuna near Cape Wiles and hauled over 400 fish aboard in four hours. At the peak of the strike, the 40-pound fish were taking the hooks at the rate of one every 10 seconds. Nearly a ton of them was hauled aboard in 10 minutes.

It was the second trip on Tacoma by two Californian fishermen who came out for trial fishing by arrangement with the South Australian Government. The paper reports them as saying:

"If your fishermen can regularly find schools of tuna like the best ones we have worked on the past three weeks, the prospects of establishing a worthwhile industry here are very good.

"To make it a stable proposition, however, you would probably need a fleet of at least a dozen boats with a crew of six or seven, and each capable of holding up to 40 tons of tuna. These boats would have to average about two tons of fish a day in your December-July season. They could go to other states when the local season ends."

The Port Lincoln cannery is paying 6d. (5.6 U.S. cents) a pound for the raw tuna, the Fisheries Newsletter (April 1956) of the Australian Commonwealth Director of Fisheries reports.

Brazil

NEW MARINE LABORATORY ESTABLISHED: A new marine biological laboratory, the Laboratorio de Biologia Marinha de Sao Sebastiao, was inaugurated in September 1955 at Segredo Beach, nearly 4 miles south of Sao Sebastiao, State of Sao Paulo, Brazil. It is operated by a foundation (Fundacao de Biologia Marinha), of which the University of Sao Paulo and its Departamento de Fisiologia Geral e Animal are founding members. It was built partially from grants made available by the University of Sao Paulo, the National Research Council of Brazil, and the Rockefeller Foundation.

The laboratory is intended to be a place where Brazilians and foreigners who are interested in marine biology can find adequate means of research. Training courses for graduate students in biological sciences will be a part of future laboratory activities.

Cambodia

CANNED FISH IMPORTS PROHIBITED: The importation of certain food products into Cambodia is now prohibited by a decree of the Minister of Finance and Economic Affairs dated April 26 and published May 9. Included among the prohibited products are canned fish and meats, and similar products such as birds' nests and abalone and sharks' fins, reports a May 10 dispatch from the United States Embassy at Phnom Penh.

Canada

BRITISH COLUMBIA REPORTS RECORD HERRING CATCH FOR 1955/56 SEASON: The greatest herring season in British Columbia's history ended with a total catch of 253,396 metric tons. From mid-November until fishing closed on March 8, a fleet of 90 seiners and many auxiliary vessels scouted and fished in coastal waters from Prince Rupert to the southern boundary, the April 1956 Trade News of the Canadian Department of Fisheries points out.

Top producing area was the Queen Charlotte Islands, where a fleet of 60 seiners and numerous packing vessels endured several weeks of rough seas and freezing temperatures to harvest a catch of 92,637 tons in waters not restricted by catch quotas. The bulk of this was taken in the vicinity of Huxley Island, near the southern tip of the Queen Charlottes, where only minor quantities previously had been caught. Fish were first located here on February 6 and steady supplies continued to arrive on the grounds from adjacent Hecate Straits until fishing stopped and catches were limited only by the packing capacity of the fleet. Subsequent surveys indicate that large schools continued in evidence at this point after the season closed. The catch consisted preponderantly of large mature fish of good quality. The total Queen Charlotte Islands catch was more than three times the quantity of any previous catch from this area and was substantially greater than the yield of any other British Columbia herring fishing area at any time.

A total of 50,084 tons was taken from the Central Area of northern mainland coastal waters. The original 40,000-ton quota in this area was extended by 10,000 tons following the appearance of a volume of large size herring just before the fishermen's Christmas recess.

In the Northern Area, the catch was 11,000 tons out of a quota of 30,000 tons. A lower take than usual was not unexpected this season, and fishing effort was also less than normal due to the heavy fishery in other areas.

Earlier in the season herring fishermen, making a delayed start, quickly harvested the original 40,000 tons quota from large supplies available in the lower east coast of Vancouver Island Area, and the quota was extended by 10,000 tons. The total take from this area amounted to 48,978 tons.

Due to the large volume of herring present in the Middle East Coast Area, two extensions of 10,000 tons each were granted over the original 10,000-ton quota and the full 30,000 tons were taken from the plentiful supplies present.

The total catch from the west coast of Vancouver Island was just short of 20,000 tons; the bulk of this was taken in Barkley Sound.

According to the seasonal bulletin issued by the Department of Fisheries, the big catch resulted in a total yield of 47,000 tons of herring meal and 4.4 million gallons of herring oil, besides other herring products.

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PLANT STANDARDS AND INSPECTION PROGRAM INAUGURATED: Uniform minimum standards for plants producing fish and shellfish products have been set by the Department of Fisheries of Canada and a voluntary program of plant inspection is being instituted in Nova Scotia, New Brunswick, and Prince Edward Island, effective May 1, points out the April 1956 Trade News of that Department.

The minimum standards for plant construction, equipment, and sanitation were reviewed by members of the Maritime fishing industry during meetings with Departmental officials in Halifax, N. S., and Moncton, N. B., in March. Agreement was reached during these meetings to enable the introduction of the minimum standards on a voluntary basis.

The minimum standards were drawn up by the technical branch of the Department's Inspection and Consumer Service following intensive research and investigation. In 1954, in cooperation with the fishing industry, the Department completed a coast-to-coast survey of more than 500 fresh, frozen, salt, and pickled fish plants which handled fish for interprovincial and international trade. The data collected during this survey was used as a basis in establishing the minimum plant standards.

A Federal-provincial meeting was held in Ottawa shortly following the survey, and the views of the ten provinces were expressed. General agreement was reached at that time on cooperative measures to bring about more effective inspection not only of fish products, but also of fish plants and procedures.

The setting of the minimum standards of construction, equipment, and sanitation of fish and shellfish plants is a further step in the advancement of the Department's over-all inspection program which is designed to maintain peak quality from the time the fish are caught until they reach the consumer.

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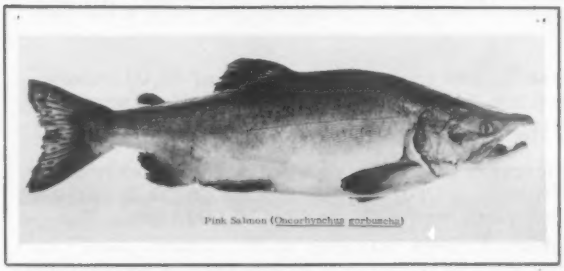
INTERNATIONAL PINK SALMON MANAGEMENT REQUESTED: At its annual meeting in Ottawa April 9-11, 1956, the Fisheries Council of Canada (National Organization of Fish Producers and Wholesalers) adopted a resolution asking the Canadian Government to discuss with the United States the problem of the pink salmon fishery of the Straits of Juan de Fuca, Puget Sound, and the Fraser River with the view in mind of "bringing under joint international management ... the valuable fishery of the area concerned."


Pink Salmon (Oncorhynchus gorbuscha)

In his speech before the annual meeting of the Fisheries Council, Canadian Minister of Fisheries James Sinclair predicted that an international agreement with the United States concerning the pink salmon runs of the Fraser River would be negotiated in the near future. He noted that Canada's west coast fishermen have been trying to get an agreement on pink salmon similar to the International Pacific Sockeye Salmon Convention which has been so successful in rebuilding the sockeye runs of the Fraser, a May 15 dispatch from the United States Embassy at Ottawa points out.

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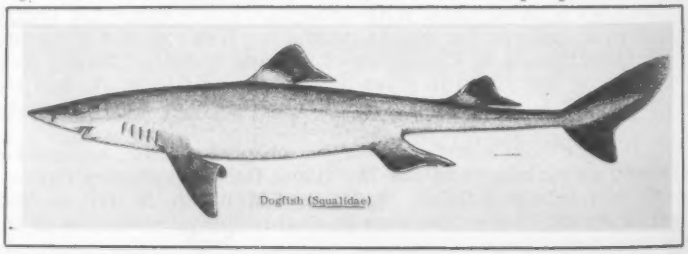
DOGFISH BOUNTY ESTABLISHED: The establishment by the Canadian Federal Department of Fisheries of bounty payments on dogfish caught by British Columbia fishermen, recently announced, will benefit both Canadian and United States fishery interests. The bounty is a direct conservation measure and its purpose is to protect a valuable food fish by the removal of a predator, the April 1956 Canadian Trade News reports.


Dogfish (Squalidae)

The Department offers to pay fishermen C$10 a ton for whole dogfish, up to 30,000 tons in the current fiscal year, delivered to any British Columbia reduction plant which is willing to convert the dogfish to fish meal. Requests for the bounty were made by the fishing industry, the fishermen's unions, and the sport fishing clubs of British Columbia. It will be of immediate benefit to the British Columbia and United States fishermen who share in the catches of food fish built up by joint conservation under the conventions between Canada and the United States for the Fraser River sockeye salmon and the Pacific halibut fisheries.

The dogfish, a small member of the shark family, has no value in Canada as a food fish, but during the last war it was fished extensively for its liver, which yields a high-potency vitamin oil. The development of cheaper synthetic vitamins since the war largely ended this industry. As a consequence the number of dogfish in coastal waters has increased enormously. They devour large quantities of valuable fish, do great damage to fishermen's gear, particularly salmon nets, and nullify the work done by the Department of Fisheries in conserving and rehabilitating the West Coast fisheries.

Dogfish can be reduced into fish meal for use in livestock and poultry feeds, but this has not been economical because of cost. It is hoped that the experience which will be gained by the reduction plants on bounty-caught fish will enable them to make dogfish reduction an economical operation in the future. With the cooperation of the fishing industry and the fishermen, it is expected that the program will markedly reduce the number of these predators.

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WHALING IN BRITISH COLUMBIA: Whaling operations off the west coast of Vancouver Island, B. C., during the 1955 season produced 630 whales from the six killer ships operated by the one company engaged in this industry. The catch was equally as good as that of the previous season when the same number was taken, which marked the largest catch for a great many years. In 1953 the total catch was 539 whales, the Trade News of April 1956 reports.

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SALT SUBSIDY FOR ATLANTIC COAST SALT-FISH PRODUCERS: The Canadian Federal Government proposes to extend into 1956 the salt-assistance program which was available to Atlantic Coast producers of salted fish in 1955, the Minister of Fisheries announced recently. Under the plan the Government rebates to fishermen and plants producing salted-fish products 50 percent of the cost of their salt, provided the products are not marketed in the United States. Exclusion of the benefit with regard to products marketed in the United States is to avoid any suggestion of subsidization of exports to that market, the Minister said.

Again the assistance will be paid only on salt used to produce salted fish for sale. Salt used for preserving fish for bait will not be included.

Payments will be made to fishermen and plants operating in Newfoundland, Nova Scotia, New Brunswick, Prince Edward Island, and Quebec. Under the 1955 program between C$400,000 and C$500,000 has been or will be distributed to these producers.

The Minister made it clear that the program is being continued only on a year to year basis, the April 1956 Trade News announced.

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BRITISH COLUMBIA'S FISHERMEN'S SHORT UNIVERSITY COURSE: For the second year in succession a short course for fishermen has been held at the University of British Columbia in Vancouver. A class of 35 professional fishermen, selected from localities along the coast, began the course March 12 and finished March 23.

Fishermen were drawn from seining, gill-netting, trolling, and trawling branches of the fishery.

In the brief but intensive course a wide range of subjects relating to practical fishing was covered. Fishermen were given an opportunity to look briefly into the fields on fisheries biology, technology, and oceanography. Electronics, marine insurance, and the work of credit unions shared time with navigation and the care of engines. The work of international fishery commissions, fisheries economics, first aid, and boat designs were other subjects on the syllabus, states the April 1956 Trade News of the Canadian Department of Fisheries.

Instructors were recruited from the University faculty, the Fisheries Research Board of Canada, the Federal Department of Fisheries, international fishery commissions, and business and industrial organizations.

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ANTIBIOTICS TESTED ON WHALE CARCASSES: Attempts are being made by the Fisheries Research Board of Canada's Pacific Fisheries Experimental Station in Vancouver to find means of retarding the marked bacterial spoilage which occurs readily in whales between time of harpooning and processing into meal, oil, and other products. In view of the success which has attended experimental use of chlortetracycline in fish preservation, tests are being made with this antibiotic as applied to whale carcasses.

In an initial trial conducted at the Coal Harbour, B. C., whaling station about two ounces of the antibiotic in 10 gallons of solution were injected into the peritoneal cavity of a sperm whale by entraining it in the compressed air used to inflate the animal. In about two days the carcass of the treated whale was still in fairly good condition, while the visceral cavity and meat of an untreated animal of similar post-mortem age were markedly spoiled. Further tests are anticipated, according to the February 1956 Trade News of the Canadian Department of Fisheries.

Ceylon

TRAWLER FISHING NOT TO BE EXPANDED: A decision against further development of trawler fishing has been announced by the Minister of Industries and Fisheries, according to the Ceylon Daily News of May 11. The Fisheries Department is operating two trawlers given by Canada and manned by Canadian officers under Colombo Plan capital aid and technical assistance.

Canada has also given considerable financing under the Colombo Plan to the development of a fishing section in Colombo Harbor. It is reported that the cold-storage plant, which is the most important installation in the harbor, will rent at low rates its surplus storage space (now that no more trawlers are to be manned) to all sections of the fish trade and, possibly, to the meat and vegetable trade, a May 17 dispatch from the United States Embassy at Colombo points out.

El Salvador

STATUS OF FISHERIES EXPANSION PLANS: The appointment of Dr. Mario Hector Salazar as the new Minister of Economy foretells increased activity on the part of the Salvadoran Government toward the development of the fishing industry. For the past four years, as Minister of Labor, Dr. Salazar has worked hard in the development of a fishing cooperative and now with authority over all marine fisheries it is expected he will encourage the advancement of the industry. The new

Minister not only has a keen interest in fishing, but indicates that a concrete program for its development would be initiated as soon as possible.

In general, El Salvador has no distribution and marketing facilities, and all phases of fish care and handling need tremendous improvement, reports the United States Operations Mission in an April 13 report.

Nine applications for permission to fish have been received by the government and five provisional fishing permits have been issued. It is estimated that the boats now fishing bring in approximately 200,000 pounds of fish a month and some 20,000 pounds of shrimp. This represents an annual production of 2.4 million pounds of fish and 240,000 pounds of shrimp. The total catch of fish by all methods is roughly estimated at 3.3 million pounds a year, a considerable increase over the old catch of approximately 1.0 million pounds.

France

FIRST DIESEL-ELECTRIC POWERED FISHING TRAWLER: While Great Britain has produced in the Sir William Hardy the first experimental and research fishing trawler powered by Diesel-electric equipment, the French will have in operation shortly the first practical workaday trawler so powered, reports The Fishing News (April 27, 1956), a British fishery periodical.

The French vessel, the Cap Fagnet III, now under construction at Ateliers et Chantiers de la Seine Maritime, has an over-all length of 245 feet, a moulded breadth of 37 feet 9 inches, a depth of 19 feet 8 inches, and a maximum draught aft of 19 feet 4 inches. The vessel will operate on the Grande Sole off Newfoundland and will be one the the world's largest fishing vessels.

This ship has already aroused considerable attention because of the bold effort to obtain maximum flexibility, high speed to and from the fishing grounds, and satisfactory power output when trawling.

A deep-sea trawler of the 223-foot class and upwards requires a propulsion power in the region of 1,200 shaft horsepower to obtain a passage speed of about 11 knots, and the power required for trawling at 3-4 knots is of the order of 1,000 shaft horsepower. To achieve a comparatively small increase in passage speed, about twice the horsepower is needed and with conventional machinery this would result in the engines running at very much reduced output when trawling.

The owners of the Cap Fagnet III have overcome these difficulties by specifying Diesel-electric propulsion. This will give the vessel an increased power of 2,000 b.hp., effect a passage speed of between 12 and 14 knots, and avoid the harmful consequences of running the engines at half power for long periods when trawling.

Diesel power is provided by three engines. They are pressure-charged intercooled units, each developing 750 b. hp. at 750 r.p.m., and each driving two self-ventilating and constant-speed generators. The generators are mounted in tandem; one is the propulsion generator, and the other an auxiliary generator used for supplying either the trawl winch motor or auxiliaries.

The propulsion generators each have a continuous output of 510 kw. at 750 r.p.m., and the auxiliary generators each have a maximum output of 195 kw. (one-hour rating) and a continuous rating of 150 kw.

The three propulsion generators are coupled up in series, for feeding--also in series, the two propulsion motors. These motors, each rated at 950 hp. at 850 r.p.m. drive the propeller through a reduction gear which allows a higher motor speed within a reduced weight and size.

The generators can be coupled to the motors in the following combinations: Full power for passage--3 generators on 2 motors; trawling--2 generators on 2 motors; slow speed and hove to--1 generator on 2 motors.

The flexibility thus obtained is supplemented by simplified maintenance at sea. Of the 100 to 120 days duration of the average fishing trip, only 16 of these will be spent in passage. During the remainder of the time spent on the fishing grounds one of the engines can be shut down. With no separate auxiliary generator sets to be maintained, there is an obvious advantage in the reduction in the number of spares to be carried. Any one of the propulsion sets is capable of propelling the vessel and the risk of total immobilization is thus reduced to a minimum.

The ventilation of the generators and motors has been closely studied. To insure effective protection of the winding of the electrical machines (against the moist salty atmosphere and oil vapors in the engineroom), closed-circuit ventilation has been adopted, in spite of its complexity.

The controls for the propulsion generators and motors are fitted on the bridge and all maneuvering of the vessel is carried out from a control desk in the wheelhouse. An automatic governor insures that the Diesel engines run at constant speed whatever the load.

To round out the story of Diesel-electric usage for trawlers, a British shipyard now is also building a vessel which will be so equipped.

German Federal Republic

RICH FISHING GROUND FOUND EAST OF GREENLAND: A German trawler which fished west of Iceland in March 1956 found another rich fishing ground only 80 nautical miles west of the Dohrn Bank in the same latitude as Angmagsalik on the east coast of Greenland, according to Dansk Fiskeritidende (April 6), a Danish fishery periodical. Dohrn Bank was found by the West German ocean research vessel Anton Dohrn last summer. The new bank is so rich in both cod and ocean perch that trawlers fill their holds in a short period.

More and more of the West German trawlers are fishing off Greenland. The trips take a few days longer than to waters off the Norwegian coast but the new grounds offer better possibilities in regard to the quality and quantity of the catch. A Bremen trawler, Herman Ahlers, returned from a 23-day trip with 5,065 boxes of edible fish or more than one-half million pounds of fish, mainly large ocean perch and cod.

Mending net on deep-sea trawler.

Greece

FREEZER-CATCHER BOAT COMPLETED FOR FISHING OFF NORTH AFRICAN COAST: The second Greek fishing vessel, the Evanghelistria (converted from the Grassholm) left Italy early in 1956 for the fishing grounds located in the Atlantic Ocean off the Mauretanean coast. The converted vessel has a gross tonnage of 484 and is propelled by a British-made 650-hp. engine. Other equipment includes up-to-date quick freezers and a cold-storage capacity of 220 metric tons. The vessel is owned by the same Greek firm that has been fishing Atlantic waters with the Evridiki. The speed of the new addition to Greece's deep-sea fishing fleet is reported to be 11 knots, according to the February 1956 Aleia.

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FREEZER-CATCHER BOAT COMPLETES FIRST TRIP: The Evanghelistria returned to her Greek home port on April 15 with a cargo of 210 metric tons of fish. The new trawler fished for 32 days off the Mauretanean coast of North Africa (Aleia, April-May 1956).

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FROZEN FISH TRIP ARRIVES FROM ATLANTIC OCEAN: The large freezer-equipped fishing vessel Evridiki arrived at Piraeus early in 1956 with 110 metric tons of frozen fish. The vessel fished off the Mauretanean coast of North Africa, according to the February 1956 Aleia, a monthly Greek fisheries review.

Haiti

COASTAL FISHERIES TO BE EXPANDED: The Haitian Department of Agriculture has formed a Fishery Office for the purpose of exploiting the coastal waters of Haiti. The Department of National Economy is cooperating, and has leased one small boat, the Santonia, which is owned by a Cuban company. The Government is not expected to buy any large amount of equipment until exhaustive tests with leased vessels have been made.

First operations were encouraging. In four hours of fishing in the Windward Passage off Môle St. Nicolas, 2,400 pounds of tuna and bonito were taken. A 90-minute test off the Caymite Islands in the Gulf of La Gonave produced 1,300 pounds of the same types. Fish ranged from 10 to 20 pounds each. Thazar (wahoo) and Chrysophrys (dolphin) were also taken in this area.

The Food and Agricultural Organization of the United Nations has had a fishery expert in Haiti for about one year. He is assisting in the present operation, points out a United States Embassy dispatch (April 13) from Port-au-Prince.

Iceland

GROUNDFISH CATCH LOWER JANUARY-MARCH 1956: The groundfish catch for the first three months of 1956 was down about 12 percent (15,100 metric tons) from the 119,900 tons caught in January-March 1955. The decline was due to a late start in January and a smaller catch in February 1956. The catch in March 1956 was close to the high level of March 1955, but represented a smaller catch

Production of Groundfish Fillets, 1953-55			
Product	1955	1954	1953
	... (1,000 Lbs.) ...		
Blocks, frozen (for fish sticks):			
Cod	7,931	26,774	-
Haddock	3,356	1,071	-
Ocean perch	56	15	-
Other (wolffish)	46	57	-
Total blocks	11,389	27,917	-
Fillets, frozen (for sale as fillets):			
Cod	52,977	40,858	43,417
Haddock	3,993	5,160	3,944
Ocean perch	44,378	29,456	16,901
Flounder	126	115	342
Other	3,447	2,670	3,229
Total fillets	104,921	78,259	67,833
Grand total	116,310	106,176	67,833
Estimate of unreported production	-	5,309	2,713
Total production of fillets and blocks	116,310	111,483	70,546

per boat since the fleet was larger in 1956. The peak catches of groundfish usually occur in April, according to a May 3 dispatch from the United States Embassy in Reykjavik.

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GROUNDFISH FILLET PRODUCTION, 1953-55: Iceland's production of groundfish fillets (including fillet blocks for use in manufacturing fish sticks) has shown a steady increase from 1953 through 1955. The production of fillet blocks declined 59 percent from 1954 to 1955, but this drop was more than offset by an increase in the production of fillets for sale to consumers as fillets.

India

GOOD POTENTIAL MARKET FOR BOATS AND ENGINES: The potential market in India for small fishing boats, small marine engines, nylon nets, and other fishing gear has come a step nearer realization through the recent work of experts of the U. N. Food and Agriculture Organization.

Fishing boat of India.

Four factors point the way: (1) an FAO master fisherman has demonstrated to Indian fishermen that with nylon bottom gill nets they can increase catches by 500 percent and earnings by 300 percent; (2) the same master fisherman had discovered a vast shrimp trawling area extending at least 140 miles down the Malabar coast, from Mangalore south to Beypore; (3) he has also found evidence of substantial stocks of sardines, mackerel, catfish, sharks, and soles on the east coast of India; and (4) the Madras State Government has drawn up a Five-Year Plan for the development of fisheries, including the provision of mechanized boats. The first twenty 30-foot boats, designed by FAO naval architects, are nearing completion.

The shrimp resource is a veritable gold mine, according to the FAO master fisherman. It is about 4 miles wide and anywhere along its 140 miles length you can catch 100 pounds of shrimp an hour. The FAO 22-foot boat loaned to five fishermen trained by the FAO master fisherman caught 11,306 pounds of shrimp and fish from March 21 to April 18. Another bigger boat, a 35-footer, fishing during the same period with a crew trained by the same master fisherman, caught 20,111 pounds.

"These catches are ten times bigger than anything the local fishermen have ever caught before and their earnings, consequently, have greatly increased," continued the FAO master fisherman. "Naturally, they are tremendously keen to work the new fishery but they need mechanized boats, shrimp trawls, winches and wire warps. The men who finance the fishermen have the money to buy equipment so a great opportunity exists for enterprising manufacturers."

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BULL-TRAWLING OPERATIONS SUCCESSFUL: Bull-trawling by the two fishing vessels Ashok and Pratap of the Pilot Deep Sea Fishing Station, Bombay, has indicated its immense potentialities off the northwest coast of India. These vessels were formerly using otter-trawl nets but were altered for bull-trawling at the end of 1953.

During the 1953/54 season, an average catch of nearly 1,350 pounds of fish per hour was obtained during an experimental operation (about 2.5 times more than by otter trawling). The quantity and percentage of commercially-valuable fish caught by bull-trawling also compared very favorably with that caught by otter trawling.

In February 1955 a record catch of 12 metric tons of fish was obtained in a single haul of $1\frac{1}{2}$ hours duration off Dwarka, just outside the Gulf of Kutch. The total catch of this voyage was 54 tons, and the average catch per hour of fishing about 2,058 pounds. This is stated to be the highest over-all average obtained so far for trawling in Indian waters, reports the Current Affairs Bulletin (April 1956) of the Indo-Pacific Fisheries Council

Indonesia

LONG-LINE TUNA FISHING MAKES GOOD START: Indonesia's first Diesel long-line tuna vessel completed six training voyages during the Djakarta area fishing season. The 100-ton 89-foot Bima is the first of four vessels which will form the nucleus of Indonesia's new long-line industry.

Long-Line fishing has been successfully used for years by the Japanese in the waters surrounding Indonesia. With Bima and her sister ships, Indonesia can for the first time exploit these waters which are one of the world's richest sources for deep-sea fishes and potentially the largest new source of protein available in Indonesia.

The tuna long-line fishing program is being carried out by the Indonesian Sea Fisheries Service with assistance from the U. S. International Cooperation Administration (ICA). The Sea Fisheries Service has provided the Rp. 800,000 vessel (US$70,000). ICA has provided an adviser and around US$9,000 of fishing equipment.

During Bima's six voyages south of the Sunda Strait, the ICA long-line technician and a man from the Sea Fisheries Institute instructed the 17-man crew in long-line fishing. Incidental to learning, the crew caught 15,000 pounds of tuna and shark which were sold at Pasar Ikan for Rp. 26,485 (US$2,300).

Developments of the long-line industry are expected to contribute substantially to the Sea Fisheries goal of doubling its present yearly catch, points out the Indo-Pacific Fisheries Council in its Current Affairs Bulletin of April 1956.

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SHRIMP FISHERY BEING DEVELOPED: A U. S. International Cooperation Administration trawl fishery expert, who has been assigned to the Indonesian Government for two years, is actively engaged in the development of the Indonesian shrimp fisheries. A native of Florida with much experience in shrimp fishing and in construction and maintenance of this type of vessel, he has begun his work with shrimp-trawl experiments in the fishing area off South East Kalimantan (Borneo).

Israel

CAMPAIGN TO EAT MORE SEA FISH PROMOTED BY PRESS TOUR: The Israel Government's program to boost the consumption of sea-caught fish was given new impetus during March by an organized press tour of representatives of the entire Israel press, arranged jointly by the U. S. Information Service and the U. S. Overseas Mission (USOM).

Israel Government plans to reduce the expenditure of foreign currency on imported protein foods place great emphasis on a considerably increased fishing industry and the introduction of sea fish as an important part of Israel's diet of animal-protein foods.

The newsmen were taken for an overnight trip on a trawler belonging to the Israel fishing fleet to the new fishing grounds recently discovered with the help of the USOM Sea Fisheries Specialist, who was on board. Top officials of the Sea Fisheries Department of the Government also took part in the trip, and apart from "Moonlight and Oysters," the newsmen had an opportunity to learn a great deal about what was being done to supply the protein-hungry population with an ever increasing supply of sea fish.

The trip paid good dividends from every point of view with excellent press coverage driving home the availability of good supplies of tasty fish. The help given to this young industry through U. S. Technical Assistance was also acknowledged.

Japan

NORTH PACIFIC SALMON INVESTIGATION PROGRAM: The Japanese Ministry of Foreign Affairs has informed the Embassy of the United States in Japan that Japanese research vessels will engage in the salmon and trout investigation program in the North Pacific area this summer in accordance with the decision reached by the International North Pacific Fisheries Commission.

The vessels that will be conducting the investigation from May 15 to August 20 are: Etsuzan Maru (152 tons), Takuyo Maru (172 tons), and the Eike Maru (111 tons).

The Etsuzan Maru will operate in the North Pacific area within 40°-49° N. latitude and 165°-180° W. longitude. The Takuyo Maru will operate within 40°-49° N. latitude and 160°-175° E. longitude; and the Eiko Maru will operate in the Bering Sea within 54°-62° N. latitude and west of 175° W. longitude.

The specialists aboard the vessels will collect operation records, and carry out oceanographic and biological investigations. (U. S. Embassy, Tokyo, May 2.)

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PACIFIC SALMON FISHERY OFF TO A GOOD START: As of May 20, 1956 the catch of salmon by the Japanese salmon fleet fishing east of 170 degrees east longitude and between 48-55 degrees north latitude amounted to 3,100,000 salmon, according to a dispatch, dated May 25, from the United States Embassy in Tokyo. Salmon fishing in this area began on May 3 and the catch is reported to be about 35 percent greater than the catch for a comparable period in 1955.

The relatively large early catch does not necessarily mean a large seasonal catch in this area as warm currents have raised the water temperatures further northward than is normal. The fishing industry is of the opinion that the increase in temperatures will cause the salmon to migrate inshore towards their spawning streams earlier than usual. Because of this factor, some observers predict a salmon catch in the unrestricted area of 15-20 million fish.

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JAPAN-RED CHINA FISHERIES COUNCIL HOLDS CONFERENCE: The annual conference to negotiate extension of the unofficial fisheries agreement between the private fishing industries of Japan and Red China was held in Peiping on April 27, 1956. The talks were expected to last about one month, according to an April 13 dispatch from the United States Embassy in Tokyo. The agreement last year was signed by private fishing interests from each country and the delegates to this conference represent private fishing companies, fishermen, and fishermen's unions.

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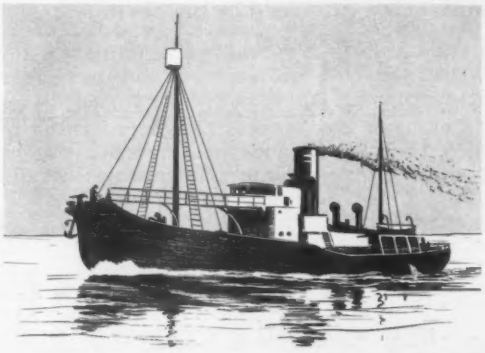
ONASSIS WHALING FLEET PURCHASED: Details relating to the purchase of the Panamanian-registered Aristotle Onassis whaling fleet consisting of one factoryship and 15 catcher boats have been completed, according to a May 18, 1956 dispatch from the United States Embassy in London. The Japanese firm, Kyokuyo Hogei KK., announced that formal possession of the fleet will take place at Rotterdam. Earlier reports of the purchase indicated that the purchase price for the factoryship Olympic Challenger was close to US$4 million and that for the 15 catcher boats about US$3.5 million.



Japanese whale catcher.

Mexico

"RED TIDE" REPORTED OFF WEST COAST: The coastal waters located off Mexico's west coast port of Manzanillo has suffered from an invasion of "Red Tide," according to newspaper reports transmitted on May 8 by the United States Embassy in Mexico City.

The "Red Tide," which is a popular name given to the sudden appearance of enormous numbers of a one-cell marine organism of the dinoflagellate group, has been reported in various parts of the world. Indications are that the invasion reported off Manzanillo has similar characteristics to previously-reported invasions of this marine organism.

Tremendous quantities of dead fish have been washed up on the beaches. Port authorities at Manzanillo have assigned squads of workmen to the task of cleaning up the beaches. This is the first time that an invasion of this type has been reported from this area.

The "Red Tide" was reported to have extended over a wide area and is believed to have originated around the Island of Islas Marias.

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MERIDA FISHERIES TRENDS, JANUARY-MARCH 1956: The Mexican area of Merida, which includes the ports of Campeche and Ciudad del Carmen, exported close to 3.1 million pounds of shrimp to the United States during January-March 1956. Other exports to the United States included 94,800 pounds of frozen fish, 3,065 pounds of shark fins, and 12,300 pounds of shark skins, states a May 3 dispatch from the United States Consul in Merida.

Due to a prosperous year in 1955, there has been a considerable expansion in shrimp vessel construction in the cities of Campeche and Ciudad del Carmen. It is estimated that about 50 percent of the new construction will contribute favorably to the shrimp fishery but the balance is believed to be an overextension of the future economic prospects of the Mexican shrimp industry.

Average prices for shrimp delivered to Brownsville, Texas, in U. S. cents a pound for the January-March period for frozen 15-20 count headless were: January, 80; February, 78; and March, 75. Due to the high price level there was considerable resistance on the part of United States buyers.

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FISHING FEES FOR FOREIGNERS INCREASED: Increased fees and taxes for foreigners commercialor sport fishing in Mexican waters became effective on May 16 in accordance with new decrees published in the May 15 Diario Oficial, reports the United States Embassy at Mexico City in a May 16 dispatch.

New Zealand

NEW WHALING STATION ESTABLISHED: A new company has been incorporated in New Zealand for the purpose of operating a whaling station on Great Barrier Island in the northernmost part of the country, states an April 23 dispatch from the United States Embassy in Wellington.

The new Great Barrier Island station is expected to operate during the 1956 whaling season. The cost of building the station is £55,000 (US$154,000). Almost all production of oil will be exported with earnings in foreign exchange of about £140,000 (US$431,000) expected annually. Exports will be chiefly to the United Kingdom and to Europe. The new station will also produce meat byproducts such as meat meal and meat for pet food.

The only other whaling station operating in New Zealand is in the Tory Channel at Te Awaiti on Cook Strait. That station has an average catch of about 115 whales annually.

Norway

CANNED FISH TRENDS, FIRST QUARTER 1956: During the first quarter of 1956 a total of 7,000 metric tons of Norwegian canned fish valued at 30 million kroner (US$4.2 million) were exported, compared to 8,300 tons valued at 35.6 million kroner (US$5.0 million) in the first quarter of 1955. The canning industry blames the decrease primarily on last year's poor brisling catch. Canning of herring and kippers during the first quarter of this year was also below the first quarter 1955 pack, according to the American Embassy at Oslo (May 11, 1956).

Government regulations on the canning industry were eased last February to permit more factories to pack herring and others to expand their production. This liberalization has not yet had any appreciable result, however. Few producers are willing to start packing brisling and small herring because the poor catches make brisling supplies doubtful.

Packing of herring and kippers is expected to be somewhat larger this year than last, but the increase will not be enough to offset losses due to the short supply of brisling.

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AUTOMATIC FEEDING AND SORTING MACHINE FOR HERRING DEVELOPED: A machine which will sort and feed herring automatically to other machines which head, eviscerate, or fillet the herring has been constructed by Peter J. F. Christie, an engineer in Bergen, Norway, according to Fiskaren (May 8), a Norwegian fishery periodical. The new machine will end the need for sorting and then feeding herring singly, by hand, with the head and belly properly directed, to the machines which process them further. The machine takes the herring directly from the shortage bin, sorts out the small herring, and then delivers two or three herring a second with the heads and bellies pointed in the directions desires. Headed herring can be handled equally well.

The machine weighs about 220 pounds, is the size of a whole herring barrel, and will cost less than US$700 (5,000 kroner). Tests of its ability to operate also on shipboard will be made this summer on some of the Norwegian vessels which operate on the high seas herring fishery off Iceland.

Panama

RED SHRIMP IDENTIFIED AS "PENAEUS BREVIROSTRIS": The "red" or "pink" shrimp which were plentiful in the Gulf of Panama for about three weeks in March 1956 are reported to be Penaeus brevirostris, as distinguished from the more common form, P. occidentalis.

Although the "red" shrimp have been of a good size (21-25 a pound heads off), they are smaller than the P. occidentalis which commonly run to 15 and under (headless) to the pound.

Based upon preliminary information, the Cooperativa Pesquera, S. A., handled 350,000 pounds of the "red" shrimp and the total catch of this species during the short three-week season may exceed 500,000 pounds. The catch would have been higher except for the four-day Easter holiday which occurred in the middle of the run, states a May 24 dispatch from the United States Embassy in Panama.

Note: Also see Commercial Fisheries Review, July 1956, p. 74.

Peru

BASE PRICES FOR WHALE MEAL AND SWORDFISH EXPORT DUTIES REVISED: The base cost price of 1,261.50 soles (US$66.39) a short ton of whale meal to be used temporarily for the assessment of export duties pursuant to a Supreme Resolution of February 7, 1955, was changed to 1,944.10 soles (US$102.32) by a Peruvian Supreme Resolution of January 12, 1956, according to a notice which appeared in the weekly bulletin of the Lima Chamber of Commerce for February 1, 1956. According to the same source, the base cost price for frozen swordfish, also for purposes of export tax assessment, was fixed at 8,240 soles (US$433.68) a short ton by the same Supreme Resolution. These prices were scheduled to remain in force until April 1956 when the local authorities were to revise them, states a March 7, 1956 dispatch from the United States Embassy in Lima.
Note: Conversion value: US$1 equals 19 soles.

Republic of the Philippines

CANNED JAPANESE ANCHOVIES CLASSIFIED AS SARDINES: The Philippine Bureau of Customs ruled on April 16, 1956, that all canned Japanese anchovies packed sardine style in tomato sauce, regardless of brand, are included in the classification of canned sardines and are exempt from the payment of the special import tax.

Portugal

CANNED FISH PACK, JANUARY-OCTOBER 1955: The pack of canned sardines in oil or sauce for January-October 1955 amounted to 21,135 metric tons (net weight). The October 1955 pack was 2,921 tons, about 39 percent less than the 4,797 tons packed in September 1955.

Portuguese Canned Fish Pack, January-October 1955

Product	Net Weight	Canner's Value	Product	Net Weight	Canner's Value
	Metric Tons	1,000 US$		Metric Tons	1,000 US$
Sardines in brine	798	122	Tuna in brine	69	33
Sardines in olive oil or sauce	21,135	11,315	Tuna in olive oil	854	721
Sardinelike fish in brine	2,095	616	Tunalike fish in olive oil	102	65
Sardinelike fish in oil	2,709	1,478	Other species (including shellfish)	576	300
Anchovies, rolled & fillets	1,285	1,380			
(Continued in next column)			Total	29,623	16,030

Note: Values converted to US$ equivalent on the basis of 28.75 escudos equal US$1.

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CANNED FISH EXPORTS, JANUARY-DECEMBER 1955: Portuguese canned fish exports totaled 6,478 metric tons (340,900 cases), valued at US$3.3 million, during December 1955; and 63,701 tons, valued at US$32.4 million, during January-December 1955.

Portugal's exports of canned fish in December 1955 declined less than 1 percent when compared with the previous month, according to Conservas de Peixe, March 1956. During January-December 1955 Germany was the leading receiver with US$6.1 million of canned fish (about all sardines in oil), followed by Great Britain with US$4.8 million (principally sardines), Italy with US$4.7 (principally

sardines and tuna), and the United States with US$4.0 million (principally 3,306 tons of sardines in oil or sauce, 43 tons of tuna and tunalike fish in oil, and 2,019 tons of anchovies). Exports of canned fish to these 4 countries (during the Jan.-Dec. period) amounted to 60.5 percent of the total exports.

Portuguese Canned Fish Exports, December 1955 and Comparisons

Species	Dec. 1955		Jan.-Dec. 1955	
	Metric Tons	1,000 US$	Metric Tons	1,000 US$
Sardines in olive oil	5,192	2,538	51,425	25,066
Sardinelike fish in olive oil	466	405	4,860	3,518
Sardines & sardinelike fish in brine	330	72	2,152	415
Tuna & tunalike in olive oil	170	129	2,251	1,667
Tuna & tunalike in brine	60	33	773	393
Mackerel in olive oil	214	134	1,644	994
Other fish	46	17	596	314
Total	6,478	3,328	63,701	32,367

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FISHERY TRENDS, DECEMBER 1955: Sardine Fishing: The catch of the Portuguese sardine fleet declined in December 1955 to 5,911 metric tons, or about 20 percent less than the November 1955 catch. The December 1955 sardine catch was valued at about US$1.0 million ex-vessel as compared with US$1.2 million in November 1955.

The sardine canning industry absorbed 73 percent (4,303 tons) with most of the balance consumed fresh. The port of Matosinhos lead all others with a catch of 4,849 tons of sardines and contributed 3,815 tons (ex-vessel value US$678,591) to the canning trade.

Other Fish: The landings of fish other than sardines totaled 3,970 tons, valued at US$334,692 ex-vessel. The catch of fish other than sardines was 90 percent chinchards (3,560 tons), followed by tuna (357 tons), and 52 tons of mixed (mostly mackerel), the March 1956 Conservas de Peixe reports.

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FISHERY TRENDS, APRIL 1956: New Sardine Fishing Season: In the past, the fishing season in Northern Portugal was from May 1 to January 31 and in the southern part of the country from April 1 to December 31. A recent order of the Ministry of the Navy establishes a uniform fishing season for both parts of the country to begin on April 15 and end on January 15. However, fishing circles state that this advance in the date is of no advantage for Northern Portugal since fish of suitable quality and size for packing are normally available from June onwards only.

One of the reasons given by official circles for creating a uniform fishing season is that under the old system fishermen from the South came North for the first month of the southern season and fishermen from the North went South for the last month of the northern season. This complicated official licensing and controls, states a May 3 dispatch from the United States Consul at Oporto.

Fishermen's Work Contract: With the opening of the new season on April 15 fishermen began signing their contracts. As in last year's season, they signed the new type of contracts as well as the old type and have the option of receiving compensation according to the one they consider to be more profitable to them. Up to the present time only a few crews are fishing.

Canned Fish Exports to the United States: Delegates of the Portuguese agency Copnor-Conservas de Peixe, Lda., have been in the United States on an investigative and promotional tour to increase exports of Portuguese canned sardines to the United States.

Copnor decided that the sales agents in the United States of the individual member firms will in the future place their orders through Copnor, which will coordinate orders and production to the best interests of its members.

The canners, together with the Portuguese Government officials, are also studying the method of avoiding excessively high prices on fresh fish, in order not to lose foreign markets, which are now objecting to the high prices of Portuguese sardines and are consequently beginning to give preference to canned fish from other sources.

Spain

FISHERIES TRENDS, APRIL 1956: In the Bilbao area, after a prolonged period of forced inactivity because of inclement weather and scarcity of fish, the coastal fishermen from the Cantabrian littoral began working practically day and night to handle the large runs of anchovy which appeared in coastal waters the last days of March 1956 and through most of April. The catch has generally been of good canning quality, states a May 15 United States consular dispatch from Bilbao.

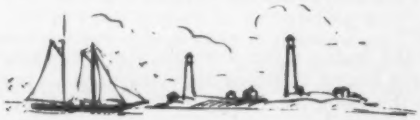
In the Vigo area, April 1956 was a poor month for the fishing industry due to the lowest catches in two years. Landings of the cheaper varieties such as castaneta and jurel were abundant at Vigo.

The Vigo fish canneries in April 1956 purchased 426,000 pounds of fresh fish, or about 6 percent of the total catches entered through the Vigo Fish Exchange. Although this was more than in March (263,000 pounds), it was far less than in April 1955 when the canneries took 2.1 million pounds of fresh fish.

Unloading Sardines

The scarcity of tin plate continued to hinder the normal operation of the fish canneries. Since the main fishing season commences in June, the tin plate situation may become critical unless the Government authorizes sufficient imports. It is reported that some of the canneries have already brought the matter to the attention of the appropriate Spanish authorities and that they have been assured that the Government will make every effort to solve this problem. Olive oil is also in short supply but there are indications that the situation will not become serious.

The canneries are concerned over the recent increase in the price of gold pesetas (from 357.70 paper pesetas to 715.00 paper pesetas per 100 gold pesetas). It has been customary for the fish canneries to apply for the importation of a certain quantity of duty-free tin plate under the Temporary Admission Law, and they are allowed two years to export fish in the duty-free tin plate. Moreover, if the export quota has not been filled, a heavy fine is assessed in addition to the payment of customs duties on the imported tin plate. Since the gold peseta enters into customs duties, the new rate is considered an extra tax on the fish-canning industry and hurts the canneries with a small export trade. The entire industry is affected by the new price of the gold peseta, since some of the imported tin plate is used in canning fish for domestic markets, a May 14 United States consular dispatch from Vigo points out.



Sweden

FROZEN FISH DEMAND INCREASES: Consumption of quick-frozen fish in Sweden should equal approximately 9,000 metric tons in 1956, which will mean that only about 20 percent of the Swedish demand can be covered by locally-frozen fish, according to a trade report which appeared in the Goteborg newspaper Ny Tid on May 9, 1956. The balance will be imported, chiefly from Norway. During the next five years it is expected by the trade that the domestic consumption of frozen fish will rise to 20,000-25,000 metric tons a year.

The present plant capacity in Sweden for the preparation and freezing of fish is reported to come close to handling the quantity of white fish that is available for freezing. Other types of fish which are well suited are whiting and haddock, but during a normal year there is not a very large surplus of these types available after the fresh fish demand is satisfied. Cod is also a variety that is well adapted for freezing but, according to the trade, offerings are adversely affected by the decline in Baltic cod fishing activity. On the other hand, Baltic herring, other herring, and mackerel are supplied to the freezing plants in good quantities, states a United States consular dispatch (May 11, 1956).

Turkey

INTERNATIONAL FISHERY EXHIBITION TO BE HELD SEPTEMBER 15-22, 1956: An exhibition of fishing equipment is being organized by the Government of Turkey to coincide with the Fourth Meeting of the Food and Agricultural Organization (FAO)-sponsored General Fisheries Council for the Mediterranean, which will meet at Istanbul, Turkey, from September 17-22, 1956.

The exhibition of fishery equipment will take place from September 15-22, 1956. Exhibition space will be available, free of charge, and special arrangements will be made to enable firms to demonstrate echo-sounders. The Turkish Foreign Trade Department will authorize the duty-free temporary import of equipment for display at the exhibition. Sales of equipment by exhibitors may be made within the limits of trade agreements between Turkey and the country of origin concerned.

Union of South Africa

PRICE CONTROLS ON HAKE AND CANNED FISH REMOVED: Price controls, in effect for several years, on hake and canned fish were removed on February 24, 1956, according to the March 1956 issue of The South African Shipping News and Fishing Industry Review, a South African trade publication.

Hake and canned fish, which are two of the most important products of the South Africa fishing industry, will now be able to find their own price on the South African market.

United Kingdom

SILVER COD TROPHY FOR 1955 AWARDED TO HULL TRAWLER: The 1955 competition for the Silver Cod trophy, which is awarded by the British Trawlers' Federation to the distant-water vessel that catches and lands the most fish, was won by the 790-ton oil-fired Hull steam trawler Kirkella.

The record-breaking catch of 2,911 long tons (6.4 million pounds) landed by the Kirkella exceeded that made by the 1954 winner, the Arctic Warrior, by 249 tons.

The Kirkella catch was valued at US$364,700, compared with a value of about US$343,800 for the 1954 winner.

The Kirkella during the course of the year spent 339 days at sea, mostly on the Arctic fishing grounds, and landed 18 trips, an average of about 18.8 days a trip. The winner in 1954 made 16 trips in 330 days at sea and averaged 20.6 days a trip. The winners in both years carried crews of 20 men, according to The Fishing News of April 13, 1956, a British fisheries trade periodical. The average annual catch per man on the Kirkella was 145 tons (319,700 pounds).

The runner-up for the trophy in 1955 was the 794-ton Hull trawler Kingston Jacinth which landed 2,864 tons (6.3 million pounds), valued at US$344,200.

The British silver cod trophy to be presented annually to the distant-water trawler with the largest total catch for the year.

The President of the British Trawlers' Federation, commenting on the award, said that the results of the 1955 competition were astonishing. He added that this was most gratifying as more and more fish were being landed by British trawlers.

The trophy, introduced in 1954 by the Federation as an incentive to boost catches, consists of a silver model of a leaping cod mounted on a mahogany stand with silver waves on which will be inscribed the names of the winning crew.

Note: See Commercial Fisheries Review, February 1956, p. 53.

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DISTANT-WATER TRAWLERMEN DOUBLE LEVY FOR ADVERTISING: In order to capture an increasing share of the United Kingdom markets for food, British Distant Water trawlermen are increasing their fish sales promotion fund by doubling the voluntary and cooperative levy on all landings at Hull, Grimsby, and Fleetwood. It will now be about 14 U. S. cents (1s.) for every 130 pounds of fish landed.

The British Trawlers' Federation advertising campaign is being handled by professional advertising and public relations firms.

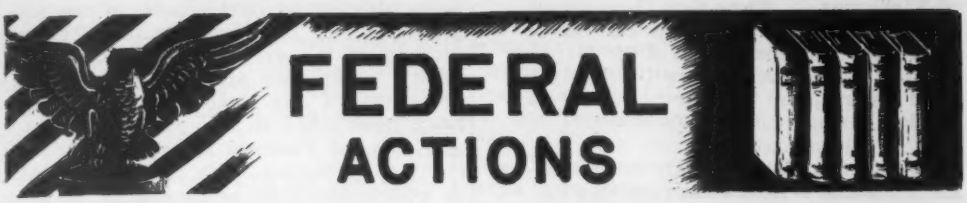
The head of the advertising firm stated that with British distant-water trawlers bringing in more and more fish and of greater variety, we intend to do everything we possibly can to stimulate consumer demand. We plan to use both the national and provincial press, national magazines, and television. We are also producing a color film and recipe books in color for housewives.

"This will be by far the heaviest and most potent campaign yet undertaken to sell fish to the British housewife, with a total budget for 1956 of about US$784,000.

"We are also employing continuous consumer research to determine trends in buying and using habits." (The Fishing News, April 20, 1956.)

Yugoslavia

SEA FISHING ASSOCIATION TO AID IN BUILDING FISH CANNERY IN INDIA: The Yugoslav Association of Sea Fishing has accepted a request from a firm located in India to give technical assistance for the building of a fish cannery in the vicinity of Manjolar. The Yugoslav industry is reported to have agreed to deliver most of the necessary equipment, such as boilers, electrical installations, and other apparatus. (March 29, 1956 report from the International Cooperation Administration in Belgrade.)



Department of the Interior

FISH AND WILDLIFE SERVICE

BROAD FISHERIES LEGISLATIVE PROGRAM PROMOTED:

Enactment of comprehensive legislation to implement the White House announcement of June 4, 1956, was urged June 8 by the U. S. Department of the Interior.

The Department also announced that it is taking prompt action to create by July 1, 1956, a separate Bureau of Fisheries under which its activities in the fishery field can be coordinated appropriately with its other related conservation functions.

The new Bureau of Fisheries will be established through reorganization of the present Fish and Wildlife Service into two separate bureaus of equal status. One bureau will handle fish, the other the Nation's wildlife resources.

A draft of the proposed legislation was sent to the House and the Senate June 8 and introduced in the Senate June 11 as S. 4021 (Payne).

The Bureau of Fisheries will be responsible for the fisheries conservation program now under the branches of game fish and hatcheries, fishery biology, commercial fisheries, Alaska fisheries, and foreign activities.

In a similar status, the bureau handling wildlife resources will carry on the many important activities now under wildlife refuges, game management, wildlife research, and predator and rodent control.

The organization pattern will make it possible, Mr. D'Ewart said, for both bureaus to work closely with each other and with other agencies of the Department on river basin studies, as well as on various Federal aid matters.

The Assistant Secretary said that as soon as the organizational pattern of the two bureaus has been established, the staffing of the top personnel positions will be announced. He pointed out that these are the first new agencies to be established in the Department of the Interior with bureau status since 1946 when the Bureau of Land Management was created.

The former Bureau of Fisheries of the Department of Commerce and the old Bureau of Biological Survey of the Department of Agriculture were brought into the Department of the Interior in 1939 and then merged into the Fish and Wildlife Service in 1940.

It was more than 85 years ago, during the administration of President Ulysses S. Grant, that the Federal Government began its battle to protect and maintain the fishery resources of this country in order to assure a supply of marine foods and to assure continuation of the sport of angling. Aware of the alarm which was spreading because overfishing was placing a greater strain on this natural resource than Nature, without help, could replenish, the Congress passed a joint resolution on February 8, 1871, authorizing the appointment of a Commissioner of Fish and Fisheries for the purpose of investigating the alleged decrease of the food fishes of the seacoasts and lakes of the United States, and to suggest remedial measures.

The United States Commission of Fish and Fisheries remained an independent agency until July 1, 1903, when it was included by law in the new Department of Commerce and Labor, and from that time on was designated as the "Bureau

of Fisheries." When that Department was subdivided in 1913, the Bureau of Fisheries became a part of the Department of Commerce where it remained until its transfer to Interior on July 1, 1939.

What is now the wildlife branch of the Fish and Wildlife Service had its inception in 1885 when the 48th Congress appropriated $5,000 "for the promotion of economic ornithology, or the study of the interrelation of birds and agriculture, an investigation of the food habits, and migrations of birds in relation to both insects and plants.

The work was made a branch of the Division of Entomology in the Department of Agriculture. One year later the work was separated from the Division of Entomology and became an independent "Division of Economic Ornithology and Mammalogy." In 1896 the Division of Economic Ornithology had its name changed to Division of Biological Survey. On March 3, 1905 it attained Bureau status and thereafter became known as the Bureau of Biological Survey.

The Wildlife Division of the Service is responsible for conducting waterfowl surveys and drawing up the annual regulations for the hunting of wild ducks and geese.

The text of the letter sent by Assistant Secretary D'Ewart to the Congress on June 8 follows:

"Enclosed herewith is a draft of a proposed bill, 'To encourage the development, marketing, and distribution of domestic fishery resources of the United States, and for other purposes.'

"We recommend that the proposed bill be referred to the appropriate committee for consideration, and we recommend that it be enacted.

"This Department, which is the Federal agency primarily responsible for conservation of the Nation's fisheries and related activities, has made a careful study of the several legislative proposals that have been presented to the Congress for consideration. These proposals have been studied also by various committees of the Congress and we have been pleased to participate in the consideration of those proposals. The provisions of the enclosed draft of bill should meet with approval from broad segments of our Nation which have been interested in the proper administration of Federal functions in the field of fisheries. We have been equally concerned with problems of recreational and commercial aspects of our fish resources.

"We believe it is generally recognized that the Fish and Wildlife Service of this Department has performed many valuable services to the fishing industry. With the growth of our national economy, and with changing international conditions, we recognize that many factors bear upon the welfare of the Nation's fisheries and the industries dependent thereon. A careful evaluation is warranted concerning the proper role of the Federal Government in this field.

"We believe this proposed legislation will, in general, be self-explanatory. In recognition of the need to render appropriate financial assistance in this field, section 3 of the measure would establish a 'Fisheries Loan Fund' with initial capital of $10,000,000, and which would operate as a revolving fund. In this connection, you will note that section 5 of the draft of bill provides that in order to avoid duplication of activities and to minimize expense in carrying out the provisions of the Act, the Secretary of the Interior shall use, whenever practicable, the available services and facilities of other agencies and instrumentalities of the Federal Government on a reimbursable basis. We anticipate, accordingly, that such authority will be used in administrating the loan fund.

"We desire also to call your attention, in particular, to section 7 of this proposed legislation. That section will have the important effect of removing the present $3,000,000 limitation now in effect concerning the use by this Department of Saltonstall-Kennedy Act funds for purposes of the Act. The authorization for transfer of the funds in question to this Department for the prescribed purposes would be continued on a permanent basis. Section 9 of this proposed

legislation would repeal certain Acts or parts of Acts that, with the enactment of this proposed legislation, will become obsolete and which for the most part will be superseded by such proposed legislation.

"We propose to carry out the functions that would be authorized by this proposed legislation through a separate Bureau of Fisheries in this Department. That Bureau will administer our functions in both the commercial and recreational fishery field. We believe this will be in the public interest and will promote good administration. Our activities in this field of public administration can be coordinated appropriately with our other conservation and related activities. At the same time, important questions of policy relating to the fisheries will receive full consideration and attention by this Department."

* * * * *

DEPARTMENT'S SOLICITOR STATES ALASKA'S AREA-LICENSING PROGRAM LEGAL:

The Department of Interior's Solicitor, J. Ruel Armstrong, in a letter to Fish and Wildlife Service Director John L. Farley held in May that the proposed area-licensing program for Alaska set to begin for the 1956 season is completely legal.

The Act of June 6, 1924, together with several suplementary acts provides the basic authority for regulations of Alaska commercial fisheries, according to Armstrong. Under this authority, the Director may "fix the size and character of nets, boats, traps or other gear or appliances to be used therein; limit the catch of fish to be taken from any area and make such regulations as to time, means, methods, and extent of fishing as he may deem advisable."

In the court case, Dow vs. Ickes, the court declared of the Interior Department authority, "Broader discretion hardly could have been conferred. The power to discriminate is geographical, temporal, mechanical, quantitative and selective as to different varieties of fish ... No standard for making discriminations is prescribed, except the general purpose of conservation and the limitation concerning monopoly ..."

The problem at hand for the 1956 season evolves around whether the Director has the authority to prohibit boats in one area from fishing another. The Solicitor stated that if the Secretary has the authority to limit the number of gear in an area he also has the authority to require that the "operation of such gear is limited to the area for which permission is granted."

Commenting on the Solicitor's opinion, Director Farley said that it appears that the salmon fisheries along the entire Pacific Coast are suffering from an influx of too much gear.

* * * * *

SUOMELA PROMOTED TO NEW FISH AND WILDLIFE SERVICE POST:

The promotion of Arnie J. Suomela, of Portland, Ore., from Assistant Director of the Fish and Wildlife Service, in charge of fisheries, to a recently created post of Associate Director was announced May 17 by Under Secretary of the Interior Clarence A. Davis.

Arnie J. Suomela

In his new capacity as Associate Director, Suomela will serve as general deputy to Director John L. Farley in directing the over-all activities of the Service including fisheries. The promotion became effective on May 15.

Suomela was appointed to the position of Assistant Director of the Service in November 1953 by former Secretary of the Interior Douglas McKay. He entered on duty in the Washington office of the Service on January 11, 1954.

Suomela is one of the United States Commissioners on both the International

Commission for the Northwest Atlantic Fisheries and the International Pacific Salmon Fisheries Commission. He is a member of the American Fisheries Society and the Pacific Fisheries Biologists.

* * * * *

WHALING REGULATIONS PUBLISHED:

The rules and regulations governing the capture and rendering of whales were published in the Federal Register on April 18 and became effective May 16, 1956. The rules and regulation as published follow:

PART 151—WHALING PROVISIONS

Basis and purpose. The act of August 9, 1950 (64 Stat. 421; 16 U. S. C. 916–916.1), known as the Whaling Convention Act of 1949, implements the International Convention for the Regulation of Whaling signed at Washington, under date of December 2, 1946, by the United States of America and certain other Governments (62 Stat. 1716). Section 12 of the Whaling Convention Act of 1949 authorizes the Secretary of the Interior to adopt such regulations as may be necessary to carry out the purposes and objectives of the Convention, the regulations of the International Whaling Commission, and the said Whaling Convention Act of 1949.

By Notice of Proposed Rule Making published in the FEDERAL REGISTER on July 22, 1955 (20 F. R. 5258), the public was invited to submit written data, views, or arguments in connection with regulations proposed to be adopted by the Secretary of the Interior to give effect to Articles V, VII, VIII, and IX of the International Convention for the Regulation of Whaling and in furtherance of the responsibilities imposed upon the Secretary by section 12 of the Whaling Convention Act of 1949. Such written views were required to be filed with John L. Farley, Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., not later than 30 days from the publication of the notice in the FEDERAL REGISTER.

RULES AND REGULATIONS

No data, views, or arguments having been received in response to the said notice, the following regulations, to become effective 30 days after publication in the FEDERAL REGISTER, are adopted to constitute a new part consisting of §§ 151.1 to 151.61:

DEFINITIONS

Sec.
151.1 Factory ship.
151.2 Land station.
151.3 Secondary processing land station.
151.4 Whale catcher.

LICENSES

151.10 Licenses required to engage in whaling.
151.11 Applications for licenses.

CLOSED SEASONS

151.20 Whale catchers attached to land stations taking baleen whales.
151.21 Whale catchers attached to land stations taking sperm whales.
151.22 Whale catchers attached to factory ships taking sperm whales.

RECORDS AND REPORTS

151.30 Records to be maintained on whale catchers.
151.31 Records to be maintained on factory ships and at land stations.
151.32 Records to be maintained at secondary processing land stations.
151.33 Report on employment, craft, and products of whaling operations.
151.34 Records retention period.

SALVAGE OF UNCLAIMED WHALES

151.40 No processing license required.
151.41 Reporting of salvage of dead whales required.

MOLESTING OR UNAUTHORIZED INTERFERENCE WITH WHALES

151.50 Molesting whales prohibited.

INSPECTION AND ENFORCEMENT

151.60 Fish and Wildlife Service employees designated as enforcement officers.
151.61 State officers designated as enforcement officers.

AUTHORITY: §§ 151.1 to 151.61 issued under Sec. 12, 64 Stat. 425; 16 U. S. C. 916j.

DEFINITIONS

§ 151.1 *Factory ship.* The words "factory ship" mean a vessel in which or on which whales are treated or processed, whether wholly or in part.

§ 151.2 *Land station.* The words "land station" mean a factory on the land at which whales are treated or processed, whether wholly or in part.

§ 151.3 *Secondary processing land station.* The words "secondary processing land station" mean a factory on the land which receives from a land station for further processing any or all of those parts of whales which are required, by paragraph 12 of the Schedule of the Whaling Convention of 1946, as amended (§ 351.12 of this title), to be processed by boiling or otherwise.

§ 151.4 *Whale catcher.* The words "whale catcher" mean a vessel used for the purpose of hunting, taking, towing, holding on to, or scouting for whales.

LICENSES

§ 151.10 *Licenses required to engage in whaling.* No person shall engage in the taking or processing of blue whales, fin whales, humpback whales, sei whales, minke whales, or sperm whales without first having obtained an appropriate license.

§ 151.11 *Applications for licenses.* Applications for licenses to engage in the taking and processing of whales of the species listed in § 151.10 shall be submitted to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C. Such application shall be accompanied by the affidavit or affidavits prescribed in section 6 (d) and (e) of the Whaling Convention Act of 1949 and by a check or United States Postal Money Order payable to the United States Fish and Wildlife Service in the appropriate amount as prescribed by the scale of license fees in section 6 (b) of the Whaling Convention Act of 1949.

CLOSED SEASONS

§ 151.20 *Whale catchers attached to land stations taking baleen whales.* It is forbidden to use a whale catcher attached to a land station for the purpose of taking or killing blue whales, fin whales, humpback whales, sei whales or minke whales, except during the period May 1 to October 31 following, both days inclusive.

§ 151.21 *Whale catchers attached to land stations taking sperm whales.* It is forbidden to use a whale catcher attached to a land station for the purpose of taking or killing sperm whales except during the period April 1 to November 30 following, both days inclusive.

§ 151.22 *Whale catchers attached to factory ships taking sperm whales.* It is forbidden to use a whale catcher attached to a factory ship for the purpose of taking or killing sperm whales except during the period April 1 to November 30 following, both days inclusive.

RECORDS AND REPORTS [1]

§ 151.30 *Records to be maintained on whale catchers.* There shall be maintained on each whale catcher a suitable log book or other record in which shall be recorded the following information, and such record shall be available for inspection by any person authorized by law or by this part to act as an inspector or enforcement officer, who shall be permitted to abstract therefrom such information as may be needed by the United States Government:

(a) The date and hour of the killing or capture of each whale;

(b) The point in latitude and longitude where each whale is killed or captured;

(c) The species of each whale killed or captured;

(d) The time of delivery of each whale to the land station or factory ship;

(e) Data specified under paragraphs (a), (b), and (c) of this section for each whale killed and later lost, or for some other reason not delivered to a factory ship or land station for processing, with an account of the circumstances surrounding such loss or nondelivery; and

(f) Any observations on migration of whales and on location of calving grounds.

§ 151.31 *Records to be maintained on factory ships and at land stations.* (a) There shall be maintained in duplicate on board each factory ship and at each land station a detailed record of all whales received and processed as follows:

[1] The record-keeping requirements contained herein have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

(1) Serial number of the whale (begin with number 1 on January 1 of each year).
(2) Species of the whale.
(3) Date and time killed and date and time received by the factory ship or land station.
(4) Sex of the whale.
(5) Length of the whale (length to be measured as specified in paragraph 9 (d) of the Schedule of the Whaling Convention of 1946, § 351.9 (d) of this title).
(6) Sex of embryo if present.
(7) Length of embryo in feet and inches.
(8) A description of the stomach contents of the whale.
(9) Name of whale catcher which took the whale.
(10) Name of gunner who killed the whale.
(11) The exact location in which the whale was taken, stated in degrees and minutes of latitude and longitude.
(12) Under "Remarks" enter, if the whale is a female, whether lactating or milk-filled as well as abnormalities or peculiarities concerning the whale and the character and quantity of any portion of the whale transferred to a secondary processing plant.

(b) Each sheet of such reports shall be verified or approved by a person authorized by law or by this part to act as inspector or enforcement officer, and the said duplicate reports for each calendar year shall be submitted to the Director of the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., within 30 days after the end of each calendar year.

§ 151.32 *Records to be maintained at secondary processing land stations.* (a) There shall be maintained by all licensed secondary processing land stations receiving from land stations parts of whales for further processing a suitable ledger or book in which the following information shall be recorded, and such records shall be available for inspection by any authorized person:
(1) The kind and quantity of parts of whales received.
(2) The date of receipt thereof.
(3) The kind and quantity of products derived therefrom.

(b) Said ledger or book or certified true copies thereof shall be submitted in duplicate to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., within 30 days after the end of each calendar year.

§ 151.33 *Report on employment, craft, and products of whaling operations.* The person or persons responsible for the operation of every factory ship, land station and secondary processing land station shall annually submit in duplicate to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., within 30 days after the end of each calendar year, a report on employment, craft and products, which shall show the number of persons employed, the nature of the task which each performs, and the manner in which each is remunerated; the number and type of vessels operated, including the net tonnage and horsepower of whale catchers and the gross tonnage and horsepower of other vessels; and the quantity and type of products manufactured, including semi-processed products delivered to secondary processing land stations. Such reports shall be subscribed and sworn to by the person or persons responsible for the operation of said factory ships, land station and secondary processing land station before a notary public or a person authorized by law or by this part to act as inspector or enforcement officer.

§ 151.34 *Records retention period.* The records required to be maintained under the regulations in this part shall be retained by the person or persons responsible for their preparation and maintenance for a period of six months following the end of the calendar year to which such records apply.

SALVAGE OF UNCLAIMED WHALES

§ 151.40 *No processing license required.* No license shall be required for the salvage and processing of any dead whale found upon a beach or stranded in shallow water, or of any unclaimed dead whale found floating at sea.

§ 151.41 *Reporting of salvage of dead whales required.* (a) Any person or persons salvaging and/or processing any dead whale of any of the species enumerated in § 151.10 shall submit a report in writing to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

(b) Such report shall show the date and exact locality in which such dead whale was found, its species and length, the disposition made of the whale, the firm utilizing or processing it, the products derived therefrom, and any other relevant facts.

MOLESTING OR UNAUTHORIZED INTERFERENCE WITH WHALES

§ 151.50 *Molesting whales prohibited.* The chasing, molesting, exciting, or interfering, with firearms or by any other manner or means, with any whale of the species listed in § 151.10 or of the species protected by the provisions of the International Convention for the Regulation of Whaling of 1946 is prohibited. Persons violating this section shall, upon arrest and conviction, be subject to the penalties imposed by the Whaling Convention Act of 1949.

INSPECTION AND ENFORCEMENT

§ 151.60 *Fish and Wildlife Service employees designated as enforcement officers.* Any employee of the Fish and Wildlife Service duly appointed and authorized to enforce Federal laws and regulations administered by the Department of the Interior and the Fish and Wildlife Service is authorized and empowered to act as a law enforcement officer for the purposes set forth in the Whaling Convention Act of 1949.

§ 151.61 *State officers designated as enforcement officers.* Any employee of a State government who has been duly designated by the Director of the Fish and Wildlife Service, with the consent of the State government concerned, is authorized and empowered to act as a Federal law enforcement officer for the purposes set forth in the Whaling Convention Act of 1949.

Issued at Washington, D. C., and dated April 12, 1956.

DOUGLAS MCKAY,
Secretary of the Interior.

[F. R. Doc. 56-3068; Filed, Apr. 17, 1956; 8:46 a. m.]

Department of State

LATEST TRADE AND TARIFF AGREEMENT CONCLUDED:

The United States Government on May 23, 1956, signed at Geneva the Protocol embodying the results of the tariff negotiations begun on January 18. The negotiations were conducted under the auspices of the Contracting Parties to the General Agreement on Tariffs and Trade (GATT).

The analysis of results of the negotiations (including details of the individual concessions by commodity) completed by the United States will be released by the Department of State on June 7. A Presidential proclamation giving effect on June 30 to the concessions granted by the United States will be issued about the same time.

The opening of this protocol for signature formally marked the end of the

1956 Tariff Conference. The United States concluded negotiations with all the 21 other countries participating. These were Australia, Austria, Belgium, Canada, Chile, Cuba, Denmark, Dominican Republic, Finland, France, West Germany, Haiti, Italy, Luxembourg, Japan, The Netherlands, Norway, Peru, Sweden, Turkey, and the United Kingdom.

Harry M. Shooshan, International Activities Assistant, Technical Review Staff, represented the Department of the Interior at this tariff negotiating conference.

Note: Also see Commercial Fisheries Review, February 1956, p. 54.

White House

ACTION TAKEN TO HELP U. S. FISHING INDUSTRY:

The White House announced on June 4 a series of actions designed to benefit the United States fishing industry.

The new program, which is the result of several months of intensive study within the administration, will be implemented in two steps.

First, Department of the Interior officials will undertake immediately the necessary preliminary steps for the creation within the Department of a new bureau with sole responsibility for Federal programs related to the fisheries. The new bureau, which will be called the Bureau of Fisheries, will come into existence on July 1, and will take over administration of all fishery responsibilities now vested in the Fish and Wildlife Service.

Secondly, the administration will request Congress to enact into law a comprehensive commercial fisheries program which will provide a broad charter for the new agency. The administration bill, which in some respects is modelled after the so-called Saltonstall-Kennedy Act due to expire next year, would authorize the Secretary of the Interior to conduct needed investigations and research into all phases of fishing activities including oceanographic, biological, statistical, and economic studies of the distribution and abundance of fishery resources, the development of new and improved methods of fishing, and the development of improved handling methods and techniques. In addition, the bill would authorize research into the nutritive value of fish and fishery products, and many other activities designed to promote the flow of fishery commodities in domestic and foreign commerce.

The provisions of the Saltonstall-Kennedy Act dealing with the transfer of certain funds from the Department of Agriculture under Section 32 of the Act of August 24, 1935 would be continued on a permanent basis and the present $3,000,000 limitation on expenditure of these funds would be removed.

Finally, the administration proposal includes the establishment of a special $10,000,000 revolving fund to be used to make loans for the maintenance, repair, and equipment of fishing vessels. Loans made from the fund will carry interest rates of not less than three percent and could be made for periods of up to ten years.

Implementation of these proposals will strengthen the Government's efforts to assist the fishing industry and underlines the administration's desire to give greater recognition to the vital role the United States fisheries play in the Nation's economy.

Eighty-Fourth Congress (Second Session)

Listed on the following page are public bills and resolutions that directly or indirectly affect the fisheries and allied industries. Public bills and resolutions are shown when introduced; from month to month the more pertinent reports, hearings, or chamber actions on the bills shown are published; and if passed, they are shown when signed by the President.

COMMERCIAL FISHERIES EDUCATIONAL PROGRAM: S. 2379 (Payne) passed the Senate on May 21, and was sent to the House where it was referred to the House Committee on Merchant Marine and Fisheries. S. 2379 failed to pass in the House by not receiving the necessary two-thirds majority for a suspension passage.

The House on July 2 passed over without prejudice H. R. 10433 (similar to S. 2379), relative to training of fishing industry personnel. H. R. 10433 (amended), a bill to promote the fishing industry in the United States and its Territories by providing for training of needed personnel for such industry; introduced April 11 (McCormack), was favorably reported to the House on June 21 by the Committee on Merchant Marine and Fisheries (H. Rept. No. 2745); referred to the Committee of the Whole House on the State of the Union.

Introduced in the House May 28, H. R. 11479 (Hale), a bill to promote the fishing industry in the United States and its Territories by providing for the training of needed personnel for such industry; to the Committee on Merchant Marine and Fisheries (similar to H. R. 10433).

COMMERCIAL FISHERIES POLICY: S. 4021 (Payne) introduced in the Senate June 11, 1956; a bill to encourage the development, marketing, and distribution of domestic fishery resources of the United States, and for other purposes; to the Committee on Interstate and Foreign Commerce. (This bill implements the action taken by the White House on June 4 to help the United States Fishing Industry and proposed legislation announced on June 8 by Assistant Secretary of the Interior D'Ewart.)

Also, H. R. 11804 (McIntire) introduced in the House June 18, 1956; similar to S. 4021; to the Committee on Merchant Marine and Fisheries.

COMMERCIAL FISHERIES NATIONAL POLICY AND FISHERIES COMMISSION: Senate passed on May 24 with amendment S. 3275, to establish a sound and comprehensive national policy with regard to fisheries resources, after adopting committee amendment (in nature of a substitute), which had first been amended by Magnuson amendment transferring from Secretary of the Interior to Fisheries Division of Interior Department, functions relating to protection of seals and whales. (See Commercial Fisheries Review, June 1956, p. 87.)

Committee on Interstate and Foreign Commerce reported to the House on July 2, H. R. 9552, to create and prescribe the functions of the United States Fisheries Commission (H. Rept. 2548).

Introduced in the House May 21, H. R. 11342 (King of Calif.) and H. R. 11343 (Wilson of Calif.), similar bills to establish a sound and comprehensive national policy with respect to the fisheries; to strengthen the fisheries segment of the national economy; to establish within the Department of the Interior a Fisheries Division; to create and prescribe the functions of the United States Fisheries Commission; and for other purposes. Also introduced May 23, H. R. 11415 (Nicholson); introduced May 28: H. R. 11502 (Tollefson); all referred to the House Committee on Merchant Marine and Fisheries, all similar to H. R. 11342 and H. R. 11343, and related to amended S. 3275 passed by Senate May 24.

COMMERCIAL FISHERIES NATIONAL POLICY AND UNDERSECRETARY FOR FISHERIES AND WILDLIFE: H. R. 11570 (Bonner) introduced in the House June 4, 1956, a bill to establish a sound and comprehensive national policy with respect to fisheries and wildlife; to strengthen the fisheries and wildlife segments of the national economy; to create and establish within the Department of the Interior the office of Undersecretary of Fisheries and Wildlife; a Fisheries Service and a Wildlife Service; and for other purposes; to the Committee on Merchant Marine and Fisheries.

H. R. 11570 (amended) was reported on June 18 favorably to the full House Committee on Merchant Marine and Fisheries by the Subcommittee on Fisheries and Wildlife Conservation. Reported favorably to the House by the Committee on Merchant Marine and Fisheries on June 28 (H. Rept. 2519), and referred to the Committee of the Whole House on the State of the Union. The bill as amended would provide for the following: (1) elevate the U.S. Fish and Wildlife Service to sub-cabinet level under an Assistant Secretary for Fish and Wildlife; (2) the Fish and Wildlife Service to be headed by a single administrator with the title of Commissioner and consist of two Bureaus within the Service, a Bureau of Commercial Fisheries and a Bureau of Wildlife, each administered by an individual director; (3) put marine mammals and such inseparable operations as Federal Aid, River Basin Studies, and game law enforcement in with Sport Fisheries and Wildlife administrative and fiscal functions would not be divided as proposed in many other bills pending before Congress); (4) removal of the limitation on the use of annual receipts now provided under the Saltonstall-Kennedy Act of 1954, so that approximately $5 million would be available each year to the Commercial Fishing Industry for authorized activities; (5) establish a revolving loan fund of $10 million for commercial fishermen for operation, maintenance, repair, and replacement of equipment of fishing gear and vessels, and for research into the basic problems of fisheries.

House Report No. 2519, Establishing a Sound and Comprehensive Policy with Respect to Fisheries and Wildlife (June 28, 1956, 84th Congress, 2nd Session), to accompany H. R. 11570, 7 pp., printed. Committee on Merchant Marine and Fisheries. Shows the committee amendments and explains the purpose of the bill.

DEFENSE PRODUCTION ACT OF 1950: President signed June 2, 1956, H. R. 9852, extending until June 30, 1958, provisions of Defense Production Act of 1950 (P. L. 632).

DISTRICT OF COLUMBIA FISH AND GAME LAWS: S. 3882 (Beall) introduced in the Senate May 18; a bill to revise and modernize the fish and game laws of the District of Columbia, and other purposes. Section 3 of the bill provides that striped bass or rockfish under 12 inches in length, measured from the tip of the nose to the tip of the tail, shall not be offered for sale in the District. Also, H. R. 11250 (Hyde) introduced in the House May 16, similar to S. 3883 (Beall); both bills referred to the Committee on the District of Columbia in each chamber.

FISH HATCHERIES: H. R. 221 (Wickersham) introduced in the first session (Jan. 5, 1956), a bill to establish rearing ponds and a fish hatchery in western Oklahoma, with amendment was reported to the House on June 7, 1956, by the House Committee on Merchant Marine and Fisheries and referred to the Committee of the Whole House on the State of the Union (H. Rept. 2269). Passed over by the House without prejudice on June 18 and July 2.

H. R. 8810, to provide for the establishment of a new fish hatchery at Miles City, Mont.; passed by the Senate on May 21, 1956, without amendment and cleared for the President. Signed by the President on June 4, (P. L. 565).

H. R. 11548 (Poff) introduced in the House May 31, 1956; a bill to provide for the establishment of a new fish hatchery in the vicinity of Point Bank, Va.; to the Committee on Merchant Marine and Fisheries.

S. 3998 (Aiken) introduced in the Senate June 5, 1956; a bill to provide for the development of the Federal Fish hatchery, known as the Holden trout hatchery, at Pittsford, Vt.; to the Committee on Interstate and Foreign Commerce. Reported favorably to the Senate by the Committee on June 21, 1956. Passed without amendment by the Senate on July 2 and cleared for the House.

H. R. 9822 (Ervin), to provide for the establishment of a new fish hatchery in North Carolina, was signed by the President June 18, 1956 (P. L. 596). Passed by the Senate on June 4, 1956, without amendment. Favorably reported to the Senate on May 23 by the Senate Committee on Interstate and Foreign Commerce (S. Rept. 2038).

FISHERIES DIVISION IN DEPARTMENT OF INTERIOR: Introduced in the House May 21, H. R. 11324 (Bates), a bill to establish a sound and comprehensive national policy with respect to the development, conservation for preservation, management, and use of fisheries resources, to create and prescribe the functions of the United States Fisheries Division of the Department of the Interior, and for other purposes; to the Committee on Merchant Marine and Fisheries. Similar and related to S. 3694.

GREAT LAKES NAVIGATION RULES: H. R. 12095 (Bonner), introduced in the House on July 3, a bill to clarify the application of navigation rules for the Great Lakes and their connecting and tributary waters and for other purposes; to the Committee on Merchant Marine and Fisheries.

INSECTICIDES EFFECTS STUDY UPON FISH AND WILDLIFE: H. R. 11839 (Metcalf) introduced in the House June 19; a bill to authorize and direct the Secretary of the Interior to undertake continuing studies of the effects of insecticides, herbicides, and fungicides upon fish and wildlife for the purposes of preventing losses of those invaluable natural resources following spraying, and to provide basic data on the various chemical controls so that forests, croplands, and marshes can be sprayed with minimum losses of fish and wildlife; to the Committee on Merchant Marine and Fisheries.

INTERIOR DEPARTMENT APPROPRIATIONS: Conferees, in executive session, agreed to file a conference report on the differences between the Senate and House-passed versions of H. R. 9390, fiscal 1957 appropriations for Interior Department and related agencies (including the Fish and Wildlife Service). House adopted the conference report on H. R. 9390 on June 4 and sent the bill to the Senate. Senate adopted conference report on H. R. 9390, clearing the bill for the White House. The bill provides $5,105,000 to the Fish and Wildlife Service for the Investigations of Resources (including the Branches of Commercial Fisheries, Fishery Biology, and Wildlife Research).

SEA NETTLES AND JELLYFISH RESEARCH: S. 3955 (Butler) introduced in the Senate May 29, 1956, a bill to authorize research by the Fish and Wildlife Service to determine methods of, and to provide for grants to the states to assist approved research or other projects for, control or extermination of sea nettles and jellyfish in Marine waters of the United States; to the Committee on Interstate and Foreign Commerce. H. R. 11627 (Miller) introduced in the House June 6, 1956; similar to S. 3955.

WATER POLLUTION: S. 890, a bill to extend and strengthen the Water Pollution Control Act. House adopted conference report and cleared the bill for the White House on June 27, 1956.

H. R. 9540, a new bill, was passed by the House June 13 and sent to conference as a House amendment to S. 890.

WALRUSES: S. 3778 an act to amend the act for the protection of walruses, passed by Senate.

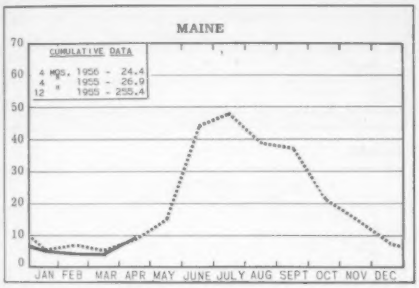
H. R. 10412 amending the act for the protection of walruses, reported out of Committee to the House on June 12 (H. Rept. 2333). S. 3778 (in lieu of H. R. 10412), a bill to amend the act for the protection of walruses; passed by the House June 18, 1956 and cleared for the White House.

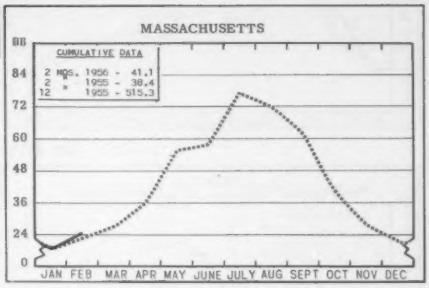
Signed by the President June 29, 1956 (P. L. 625). The amendment to the Act permits the taking of one bull walrus per year by a duly licensed non-native hunter under certain conditions. Also establishes nonresident and nonnative license fees and provides other protective regulations.

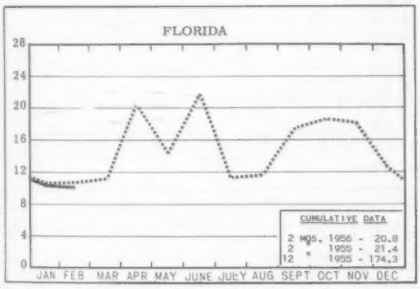
COMMERCIAL FISHERIES NATIONAL POLICY: Establishment of a National Policy for Commercial Fisheries (Hearings before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, Eighty-Fourth Congress, Second Session on: H. R. 8001 and identical bills to establish a national policy with respect to commercial fisheries; to establish the office of Assistant Secretary of Commerce for Commercial Fisheries, and define his functions, powers, and responsibilities; to strengthen the commercial fisheries segment of the national economy, and for other purposes. H. R. 9552 and identical bills to establish a sound and comprehensive national policy with respect to the development, conservation for preservation, management and use of fisheries resources, to create and prescribe the functions of the United States Fisheries Commission, and for other purposes. H. R. 10813 and identical bills to establish a sound and comprehensive national policy with respect to the fisheries; to create and prescribe the functions of the United States Fisheries Commission; to strengthen the fisheries segment of the national economy, and for other purposes. H. R. 11309 and identical bills to establish a sound and comprehensive national policy with respect to fisheries; to strengthen the fisheries segment of the national economy; to establish within the Department of the Interior a Fisheries Division; to create and prescribe the functions of the United States Fisheries Commission; and for other purposes. H. R. 11570 to establish a sound and comprehensive national policy with respect to fisheries and wildlife; to strengthen the fisheries and wildlife segments of the national economy; to create and establish within the Department of the Interior the Office of Undersecretary of Fisheries and Wildlife, a Fisheries Service and a Wildlife Service; and for other purposes. May 10, 21, 22, and June 8, 1956), 253 pp., printed. Presents the statements of the witnesses appearing before the Committee; information supplied the Committee by various individuals, Congressmen, and organizations; reports from Federal Departments; and the texts of the various bills.

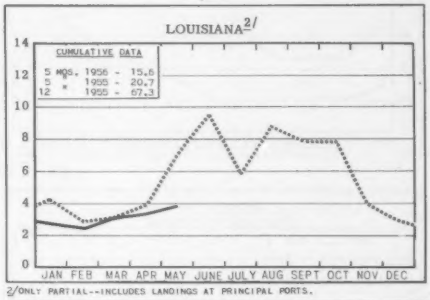
CHART I - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

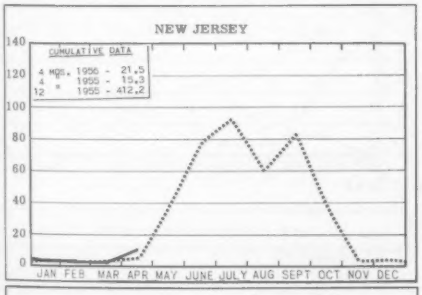


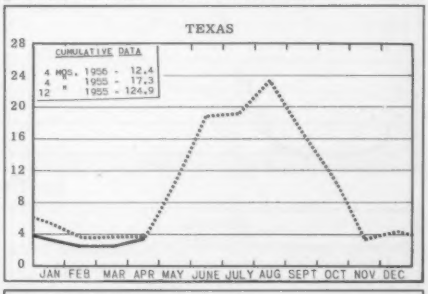


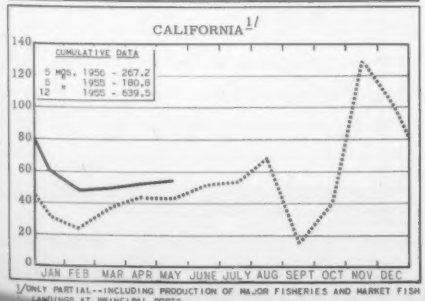




2/ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.







1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

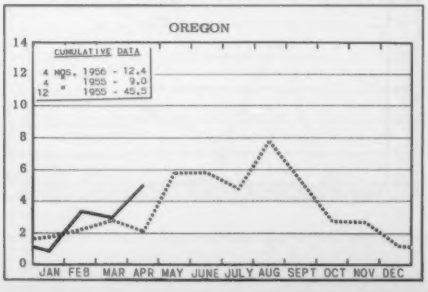
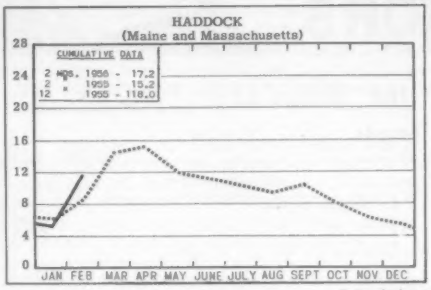
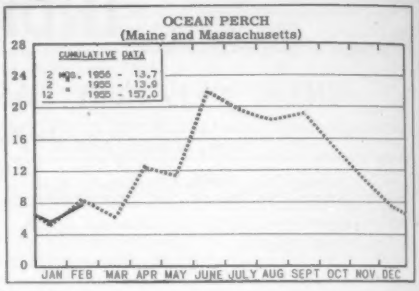


CHART 2 - LANDINGS for SELECTED FISHERIES

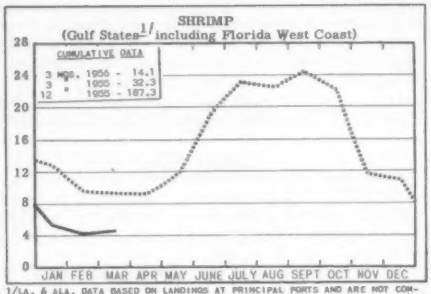
In Millions of Pounds



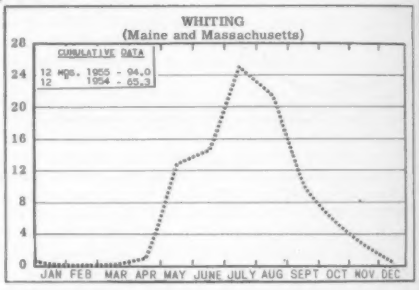
Legend:
1956
1955



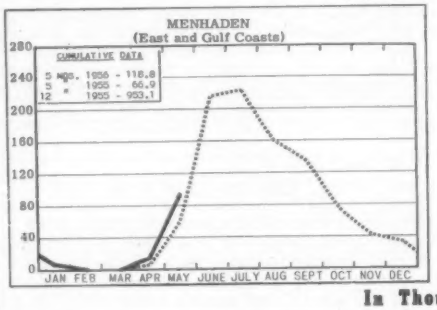
In Millions of Pounds

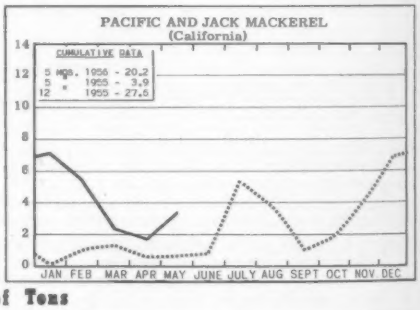


1/ LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

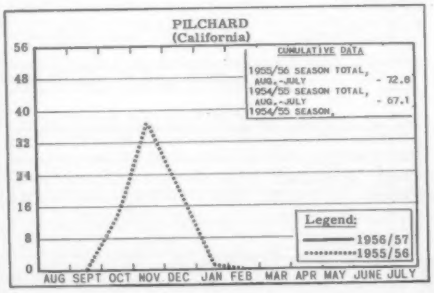


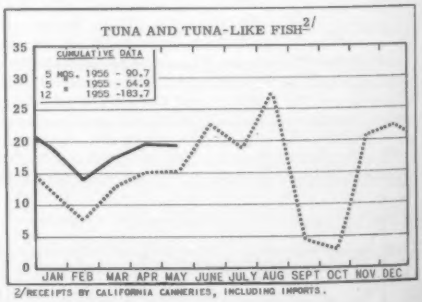
In Thousands of Tons





In Thousands of Tons

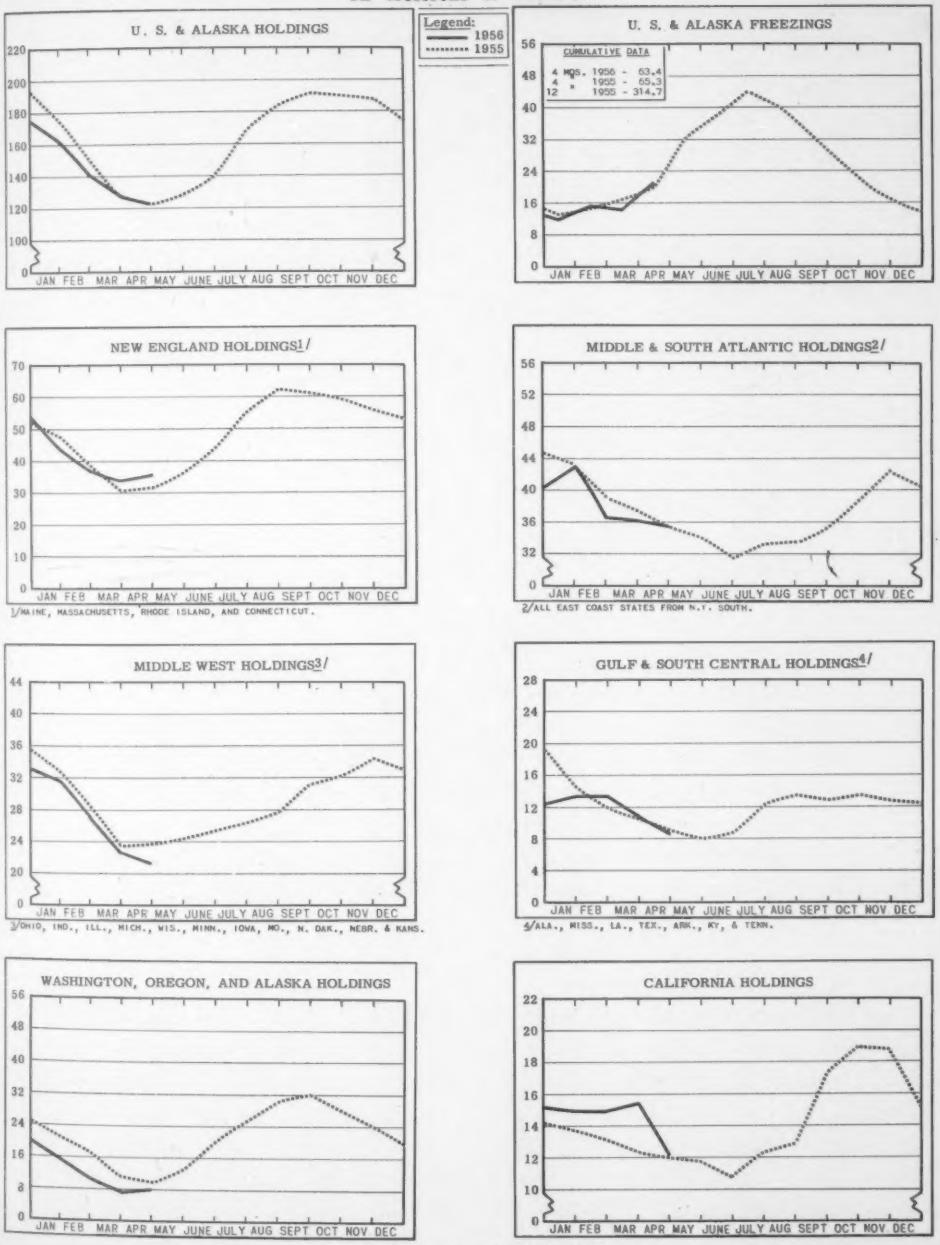




2/ RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds


U. S. & ALASKA HOLDINGS
Legend:
1956
1955
U. S. & ALASKA FREEZINGS
CUMULATIVE DATA
4 MOS. 1956 - 63.4
4 " 1955 - 65.3
12 " 1955 - 314.7
NEW ENGLAND HOLDINGS1/
MIDDLE & SOUTH ATLANTIC HOLDINGS2/
MIDDLE WEST HOLDINGS3/
GULF & SOUTH CENTRAL HOLDINGS4/
WASHINGTON, OREGON, AND ALASKA HOLDINGS
CALIFORNIA HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.

2/ALL EAST COAST STATES FROM N.Y. SOUTH.

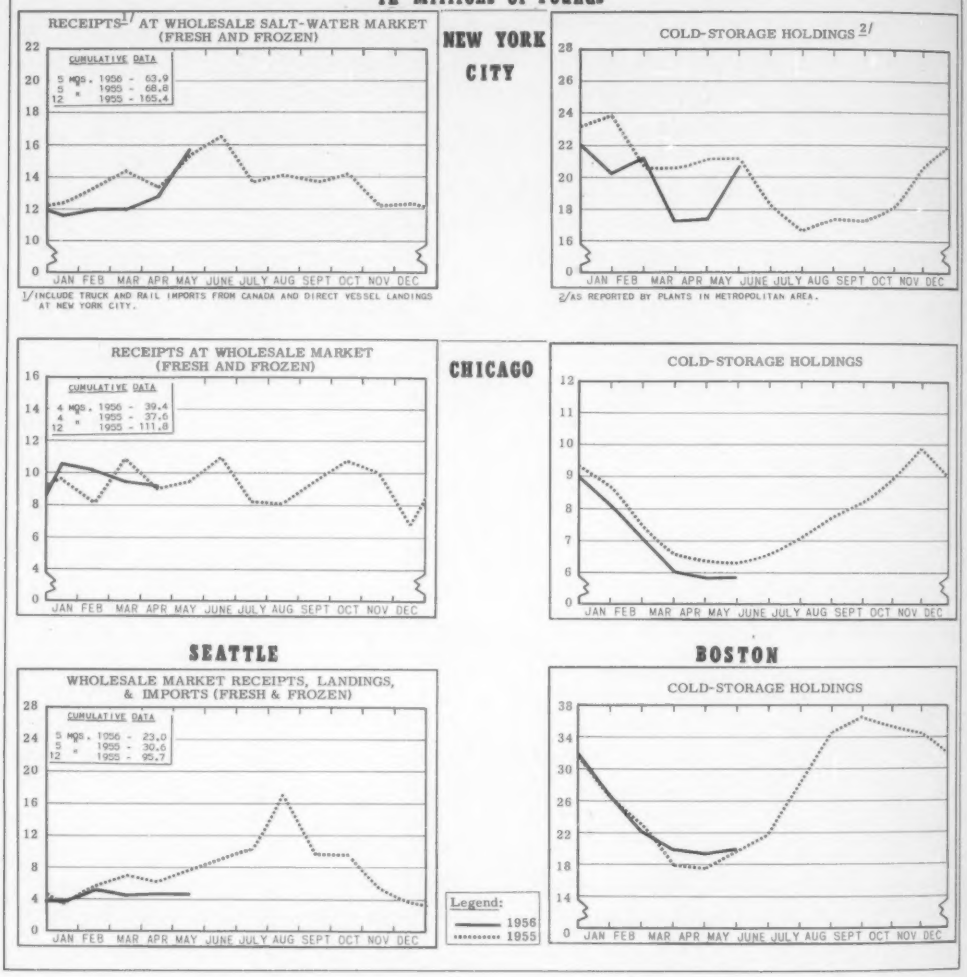
3/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

4/ALA., MISS., LA., TEX., ARK., KY, & TENN.

*Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds


RECEIPTS 1/ AT WHOLESALE SALT-WATER MARKET (FRESH AND FROZEN)
CUMULATIVE DATA
5 MOS. 1956 - 63.9
5 " 1955 - 68.8
12 " 1955 - 165.4
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
NEW YORK CITY
COLD-STORAGE HOLDINGS 2/
RECEIPTS AT WHOLESALE MARKET (FRESH AND FROZEN)
CUMULATIVE DATA
4 MOS. 1956 - 39.4
4 " 1955 - 37.6
12 " 1955 - 111.8
CHICAGO
COLD-STORAGE HOLDINGS
SEATTLE
WHOLESALE MARKET RECEIPTS, LANDINGS, & IMPORTS (FRESH & FROZEN)
CUMULATIVE DATA
5 MOS. 1956 - 23.0
5 " 1955 - 30.6
12 " 1955 - 95.7
BOSTON
COLD-STORAGE HOLDINGS
Legend:
1956
1955

1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

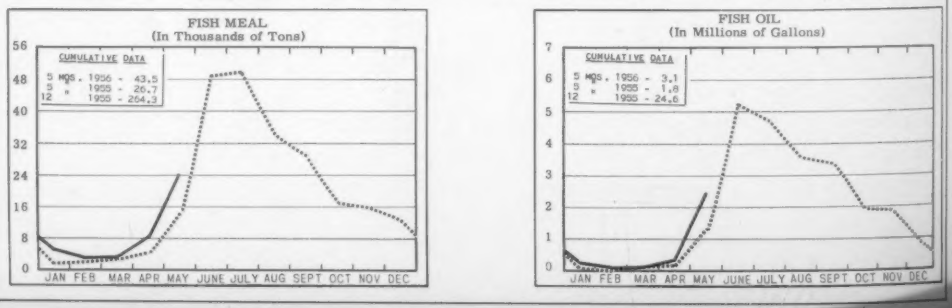
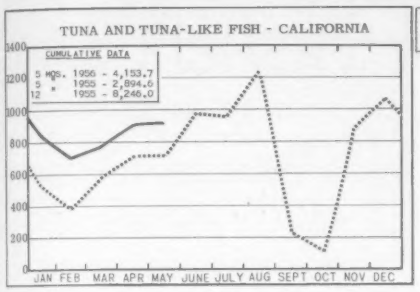
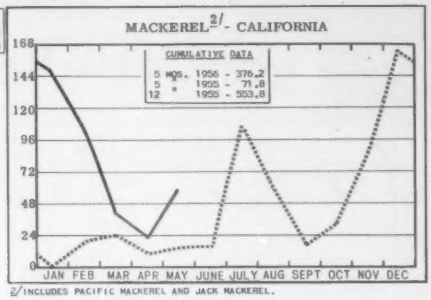

FISH MEAL
(In Thousands of Tons)
CUMULATIVE DATA
5 MOS. 1956 - 43.5
5 " 1955 - 26.7
12 " 1955 - 264.3
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
FISH OIL
(In Millions of Gallons)
CUMULATIVE DATA
5 MOS. 1956 - 3.1
5 " 1955 - 1.8
12 " 1955 - 24.6

CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

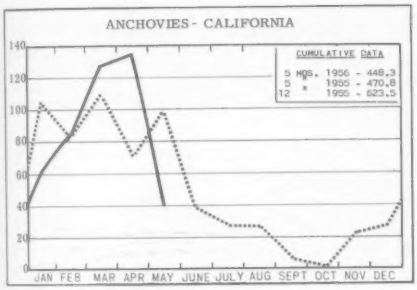
In Thousands of Standard Cases

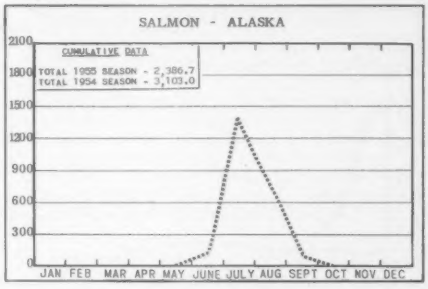

TUNA AND TUNA-LIKE FISH - CALIFORNIA
CUMULATIVE DATA
5 MOS. 1956 - 4,153.7
5 " 1955 - 2,894.6
12 " 1955 - 8,246.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

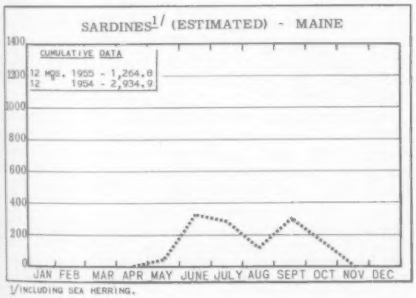
Legend:
1956
1955


MACKEREL 2/ - CALIFORNIA
CUMULATIVE DATA
5 MOS. 1956 - 376.2
5 " 1955 - 71.8
12 " 1955 - 553.8
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.


ANCHOVIES - CALIFORNIA
CUMULATIVE DATA
5 MOS. 1956 - 448.3
5 " 1955 - 470.8
12 " 1955 - 623.5
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

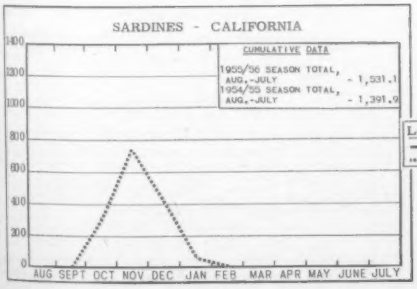

SALMON - ALASKA
CUMULATIVE DATA
TOTAL 1955 SEASON - 2,386.7
TOTAL 1954 SEASON - 3,103.0
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC


SARDINES 1/ (ESTIMATED) - MAINE
CUMULATIVE DATA
12 MOS. 1955 - 1,264.8
12 " 1954 - 2,934.9
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA	48	No. ½ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	½ lb.	8 oz.


SARDINES - CALIFORNIA
CUMULATIVE DATA
1955/56 SEASON TOTAL, AUG.-JULY - 1,531.1
1954/55 SEASON TOTAL, AUG.-JULY - 1,391.9
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY

Legend:
1956/57
1955/56

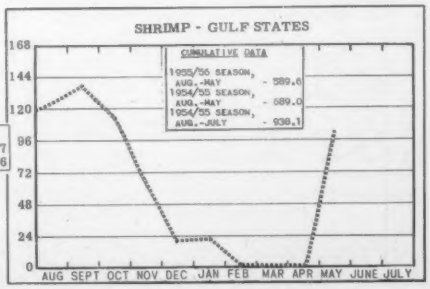
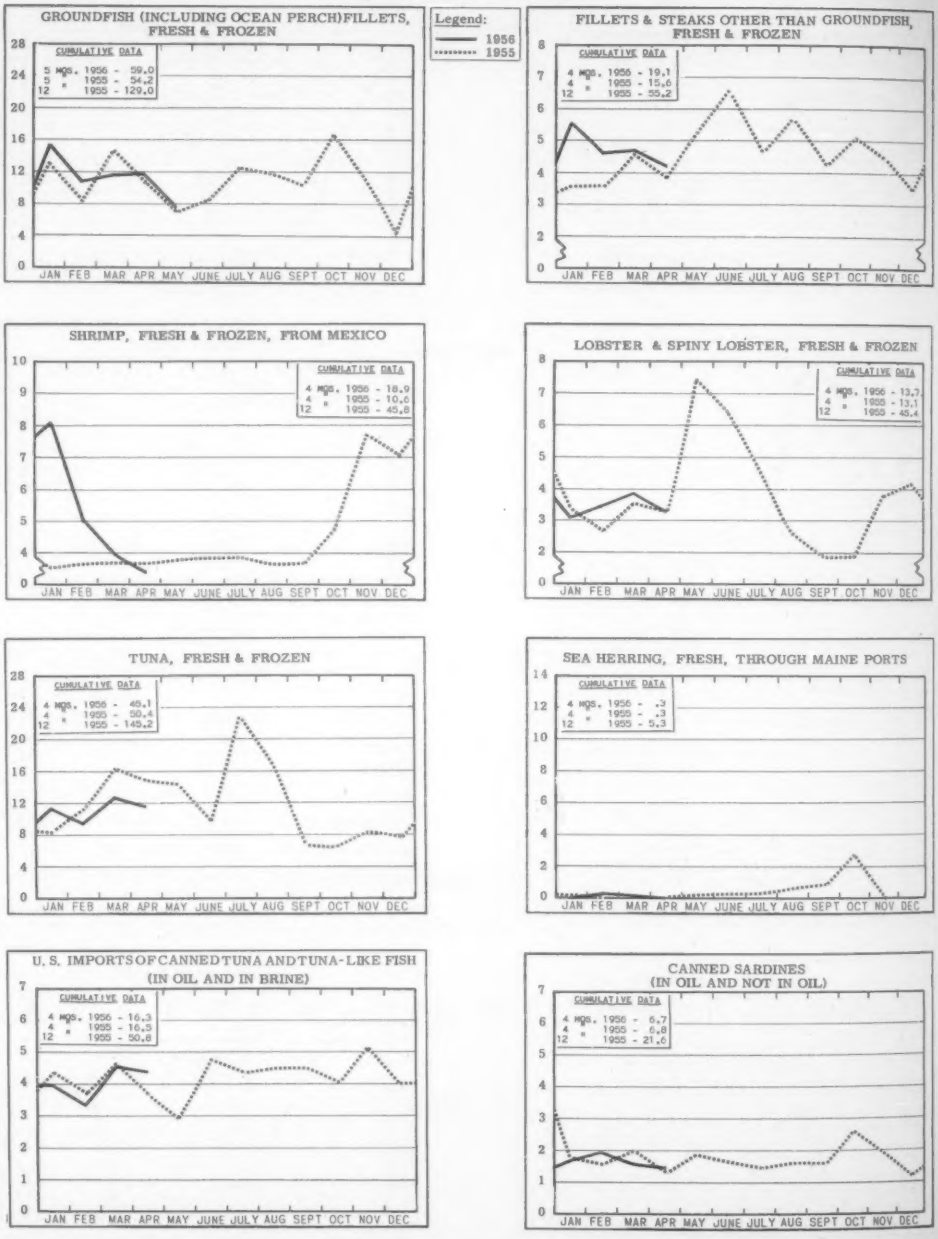
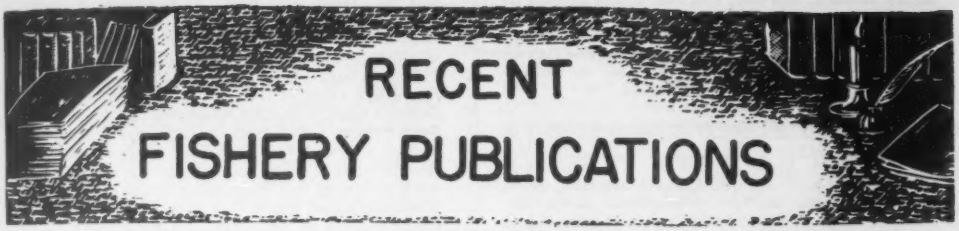

SHRIMP - GULF STATES
CUMULATIVE DATA
1955/56 SEASON, AUG.-MAY - 589.6
1954/55 SEASON, AUG.-MAY - 589.0
1954/55 SEASON, AUG.-JULY - 930.1
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY

CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds


GROUNDFISH (INCLUDING OCEAN PERCH) FILLETS, FRESH & FROZEN
CUMULATIVE DATA
5 MOS. 1956 - 59.0
5 " 1955 - 54.2
12 " 1955 - 129.0
Legend:
1956
1955
FILLETS & STEAKS OTHER THAN GROUNDFISH, FRESH & FROZEN
CUMULATIVE DATA
4 MOS. 1956 - 19.1
4 " 1955 - 15.6
12 " 1955 - 55.2
SHRIMP, FRESH & FROZEN, FROM MEXICO
CUMULATIVE DATA
4 MOS. 1956 - 18.9
4 " 1955 - 10.6
12 " 1955 - 45.8
LOBSTER & SPINY LOBSTER, FRESH & FROZEN
CUMULATIVE DATA
4 MOS. 1956 - 13.7
4 " 1955 - 13.1
12 " 1955 - 45.4
TUNA, FRESH & FROZEN
CUMULATIVE DATA
4 MOS. 1956 - 46.1
4 " 1955 - 50.4
12 " 1955 - 140.2
SEA HERRING, FRESH, THROUGH MAINE PORTS
CUMULATIVE DATA
4 MOS. 1956 - .3
4 " 1955 - .3
12 " 1955 - 5.3
U. S. IMPORTS OF CANNED TUNA AND TUNA-LIKE FISH (IN OIL AND IN BRINE)
CUMULATIVE DATA
4 MOS. 1956 - 16.3
4 " 1955 - 16.3
12 " 1955 - 50.8
CANNED SARDINES (IN OIL AND NOT IN OIL)
CUMULATIVE DATA
4 MOS. 1956 - 6.7
4 " 1955 - 6.8
12 " 1955 - 21.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
MDL - MARKET DEVELOPMENT LISTS.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number Title

CFS-1276 - Frozen Fish Report, Annual 1955, 14 pp.
CFS-1283 - Texas Landings, Jan. 1956, 3 pp.
CFS-1291 - Frozen Fish Report, Feb. 1956, 8 pp.
CFS-1293 - New York Landings, Jan. 1956, 4 pp.
CFS-1294 - Florida Landings, Dec. 1955, 6 pp.
CFS-1301 - Mississippi Landings, Jan. 1956, 2 pp.
CFS-1302 - California Landings, Dec. 1955, 4 pp.
CFS-1303 - New Jersey Landings, Feb. 1956, 3 pp.
CFS-1304 - Texas Landings, Feb. 1956, 3 pp.
CFS-1306 - Frozen Fish Report, Mar. 1956, 8 pp.
CFS-1307 - Fish Stick Report, Jan.-Mar. 1956, 2 pp.
CFS-1308 - North Carolina Landings, Feb. 1956 2 pp.
CFS-1310 - Mississippi Landings, Feb. 1956, 2 pp.
CFS-1315 - Rhode Island Landings, Feb. 1956, 3 pp.
CFS-1319 - Maine Landings, Feb. 1956, 3 pp.
CFS-1320 - Alabama Landings, Feb. 1956, 2 pp.
CFS-1321 - Chesapeake Fisheries, 1954 Annual Summary, 8 pp.
CFS-1322 - Ohio Landings, Mar. 1956, 2 pp.
CFS-1332 - Shrimp Landings, Mar. 1956, 4 pp.
CFS-1334 - Maine Landings, Mar. 1956, 3 pp.

WHOLESALE DEALERS IN FISHERY PRODUCTS:

SL - 3 - Massachusetts, 1955 (revised), 9 pp.
SL - 16 - Florida, 1955 (revised), 9 pp.

FIRMS CANNING FISHERY PRODUCTS:

SL -102A - Pacific Sardines, 1955, 1 p.
SL -102 - Maine Sardines, 1955 (including sea herring), 1 p.
SL -103 - Tuna and Tunalike Fishes, 1955, 2 pp.
SL -104 - Mackerel, 1955, 1 p.
SL -105 - Alewives and Alewife Roe, 1955, 1 p.
SL -108 - Salmon Eggs for Bait, 1955, 1 p.
SL -112 - Shrimp, 1955, 2 pp.
SL -117 - Pacific Sea Herring, 1955, 1 p.
SL -119 - Squid, 1955, 1 p.
SL -120 - Anchovies, 1955, 1 p.

FL -336bb - Commercial Fisheries Outlook, Apr.-June 1956, 40 pp.
FL -393 - Fisheries of the United States & Alaska, 1955 (revised), 3 pp.

MARKET DEVELOPMENT LISTS (REVISED):

MDL-11 - New Hampshire Locker Plants, May 1956, 1 p.
MDL-15 - Mississippi Locker Plants, Mar. 1956, 3 pp.
MDL-32 - New Mexico Locker Plants, May 1956, 3 pp.
MDL-47 - Wyoming Locker Plants, May 1956, 3 pp.
MDL-53 - Nevada Locker Plants, May 1956, 1 p.

Sep. No. 438 - Technological Studies on the Processing of Sea Lions.
Sep. No. 439 - Iron Sulfide Discoloration of Tuna Cans, No. 3 - Effect of Variables Introduced by the Fish.
Sep. No. 440 - Research in Service Laboratories (June 1956): Contains these short articles--"Fish Oils in Sprays for Citrus Trees," "Alaska Shrimp Waste has Possibilities as Hatchery Food," "Tech. Note. No. 33 - Reduction of Dehydration in Frozen Fish-Fillet Blocks," "Interim Federal Specifications for Canned Sardines."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, March 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.

Boston Fishery Products Monthly Summary, March 1956, 16 pp. Boston Fishery Products Monthly Summary, April 1956, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the months indicated.

(New York) Monthly Summary, February 1956, Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4 pp. Monthly Summary-March 1956, Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces for the month indicated.

California Fishery Products Monthly Summary, March 1956, 10 pp. Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. California cannery receipts of raw tuna and tunalike fish, herring, and squid; pack of canned tuna, mackerel, herring, anchovies, and squid; market fish receipts at San Pedro,

Santa Monica, Eureka, and San Diego areas; United States imports of fishery products into California and Arizona; cold-storage freezings and holdings of fishery products; canned fish and frozen shrimp prices at the primary or wholesale level; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, April 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Fisheries production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

(Chicago) March 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Prices, 10 pp., (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the month indicated.

(Seattle) Monthly Summary of Fishery Products, April 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 421 Bell St. Terminal, Seattle 1, Wash.) Includes landings and local receipts as reported by Seattle and Astoria (Oregon) wholesale dealers.

"Mortality of Olympia Oysters at Low Temperatures," by Harry C. Davis, 3 pp., printed. (Reprinted from Biological Bulletin, vol. 109, no. 3, December 1955, pp. 404-406.) (Available free from the Fishery Biological Laboratory, U. S. Fish and Wildlife Service, Milford, Conn.)

Open Letter to All Aku Fishermen, 6 pp., illus., processed. (Available free from Pacific Oceanic Fishery Investigations, P. O. Box 3830, Honolulu, Hawaii.)

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

"Age Composition of the Southern California Catch of Pacific Mackerel for the 1954/55 Season," by John E. Fitch, article, California Fish and Game, vol. 42, no. 2, April 1956, pp. 143-148, printed. California Department of Fish and Game, 926 J St., Sacramento 14, Calif.

Aktuelle Fryseritekniske Spørsmål (Topical Refrigeration Problems), articles, Fiskeridirektoratet Skrifter, 1954, Serie Teknologiske Undersokelser, vol. 2, no. 15, 1954, 149 pp., illus., printed in Norwegian.

(Alabama) Department of Conservation, Report for Fiscal Year October 1, 1954, September 30, 1955, 232 pp., illus., printed. Department of Conservation, Montgomery 4, Ala., 1956. Presents the annual reports of the Alabama Department of Conservation for the fiscal year October 1, 1954, through September 30, 1955. Among these are reports from the Fish Management Section and Fisheries Research Section of the Department's Division of Game and Fish. The primary objective of the Fish Management Section is to apply fish management techniques in such a way as to obtain the highest possible production and harvest of fish from the inland fresh waters of the State. In the Fisheries Research Section, work was continued at Auburn upon fish parasites, the toxicity of various chemicals to fish and fish food organisms, pond weed control, the effect of herbicides upon fish production, and other phases of pond and lake management. The Division of Seafoods reports on the shrimp, clam, and oyster research programs, shrimp and oyster production, and other activities.

(Alaska) 1954 Annual Report, Report No. 6, 92 pp., illus., printed. Alaska Fisheries Board and Alaska Department of Fisheries, Juneau, Alaska, 1956. Summarizes the activities of the Alaska Fisheries Board and the Alaska Department of Fisheries for 1954. The work of the Biological Research Division was centered on the investigations of the troll salmon fishery of Southeastern Alaska, the salmon runs of the Taku River, the black cod fishery, the Kodiak king crab, and with continued construction and improvement of facilities at the Kitoi Bay Research Station. The king crab investigation has already paid dividends in pointing the way toward proper management of this new industry. Also describes the inspection, predator control, sport fish, and watershed management programs. The statistical part of the report contains data on the value of canned salmon by species (1945-54); number of canneries and the salmon pack (1945-54); salmon catch by gear, species, and districts, 1954; quantity and value of Alaska fisheries landings (1945-54); and quantity and value of Alaska fisheries products as prepared for market (1945-54). In addition to a financial statement, the report concludes with a discussion of the plans of the Department and its future outlook.

Annual Report of the Fisheries Research Board of Canada for the Year 1954, 187 pp., printed (Introduction is in English and French and balance of report in English). Fisheries Research Board of Canada, Ottawa, Canada, 1954. Full reports are presented of the work for 1954 of the biological and experimental stations of the Fisheries Research Board of Canada. The work of the Board is organized in three closely coordinated fields: Biological, technological, and oceanographic. During 1954 much effort was also expended in the field of industrial development. Stations for the study of the biology of fish are maintained at St. Andrews, N. B.; St. John's, Newfoundland; Winnipeg, Manitoba; and Nanaimo, B. C. Biological investigations in the Eastern Arctic are carried out from headquarters on the McGill University Campus, Montreal, P. Q. For greater convenience in covering the great distances involved these principal stations maintain field stations at appropriate places and port observers at the major fishing centers.

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The workers at these stations are concerned with the stocks of fish as they occur in the ocean or fresh water; finding out how many are caught, where and when they are caught, and how much effort was expended in catching them. Also studied are the rates of growth of populations of fish, their age at maturity, their fecundity, and their mortality, all with a view to determining the level of fishing effort which will exploit the fish populations most efficiently and profitably. Technological stations are situated at Halifax, N. S.; Grand River, P. Q.; and Vancouver, B. C. A technological unit comprised primarily of engineering services is stationed at St. John's, Newfoundland. Workers at these stations devote their attention to the fish from the time they are taken out of the water until they are purchased by the consumer. Experiments are carried out to improve methods in handling, preserving, processing and transporting fish, and in making useful products out of fish waste. Oceanographic work continues to be carried on from the coastal biological stations. A list of the publications and reports that were published in 1954 by the Board is included.

"The Atlantis Marine Geological Expedition to Peru and Chile," by Dr. Parker D. Trask, article, Nature, vol. 177, no. 4506, March 10, 1956, pp. 454-455, printed, single copy 2s. (28 U. S. cents). Macmillan & Co., Ltd., St. Martin's St., London, W. C. 2, England. Describes an expedition conducted under the auspices of Woods Hole Oceanographic Institution. The research vessel Atlantis was used to explore the deep trenches that lie off the coast of Peru and northern Chile during November and December 1955. The primary objective of the expedition was to study the sediments.

Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, 1954, printed in Japanese with summaries in English. Japanese Society of Scientific Fisheries, Tokyo, Japan. Contains among others the following articles: "Experiment on the Antisepsis of Foods by Radioactive Rays. Preliminary Report--Preservation of Foods by Gamma-Radiation;" and Parts I and II--"Studies on the Concentration of Liver Oils. Application of Paper Chromatography for Selecting Solvent."

Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, 1955, illus., printed in Japanese with summaries in English. Japanese Society of Scientific Fisheries, Tokyo, Japan. Contains among others the following articles: Parts II, III, IV, and V--"Experiment on the Antisepsis of Foods by Radioactive Rays. Preservation of Foods by Gamma-Radiation;" "On the Relation between Height of Drying Position of Fish and Number of Attached Flies;" and "Studies on the Economical Manufacture of Vitamin A Concentrate from Fish Liver Oil. VI. Esterification of Vitamin A Concentrate. Acetylation and Palmitylation with Acid Chloride."

Bulletin of the Japanese Society of Scientific Fisheries, vol. 21, 1955, printed in Japanese with summaries in English. Japanese Society of Scientific Fisheries, Tokyo, Japan. Contains among others the following articles: Parts I and II--"Studies on Utilization of Fish-Wastes. On Preservation with Cereals, their Offals, and Sawdust."

Bulletin Officiel D'Information du Conseil Superieur de la Peche (Official Information Bulletin of the Supreme Fishery Council), Number 23, January-February-March 1956, 71 pp., illus., printed in French. Conseil Superieur de la Peche, 1 Avenue de Lowendal, Paris, France.

(Canada) Department of Fisheries Twenty-Fifth Annual Report, 1954-1955, 79 pp., printed. Department of Fisheries, Ottawa, Canada. This is the 88th Annual Fisheries Report of the Government of Canada. Discusses the conservation and development service; inspection and consumer service; markets and economics service; information and educational service; industrial development service; Fishermen's Indemnity Plan; Fisheries Prices Support Board; Fisheries Research Board; international commissions; and special committees. A section of the report is devoted to a review (with statistics) of Canada's fishing industry during 1954. An appendix presents the financial statements of the Department's various activities for 1954-55.

(Canada) Journal of the Fisheries Research Board of Canada, vol. 13, no. 2, March 1956, pp. 147-272, illus., printed. Fisheries Research Board of Canada, Ottawa, Canada. Contains, among others, the following articles: "Jellied Condition in the American Plaice, Hippoglossoides platessoides (Fabricius)," by Wilfred Templeman and Gertrude L. Andrews; "Spoilage of Fish in the Vessels at Sea: 3. The Value of Nitrite Ice and Nitrite Dips for the Preservation of Gutted Fish in the Hold of the Vessel," by C. H. Castell and G. K. Gunnarsson; "Atlantic Salmon Tagged in East Coast Newfoundland Waters at Bonavista," by A. A. Blair; and "Effects of Temperature, Salinity and Oxygen on the Survival of the American Lobster," by D. W. McLeese.

(Canada) Preliminary Annual Report of the Maritime Fisheries, 1955, 43 pp., processed, in French and English. Quebec Bureau of Statistics, Department of Trade and Commerce, Quebec, Canada. Statistics show quantity and value of fish caught in the Province of Quebec during 1955, 1954, and 1953, by species, counties, and landing points; and catch and disposition of the principal species of fish.

(Ceylon) Progress Reports, Biological and Technological, No. 1, 23 pp., illus., printed. Fisheries Research Station, Department of Fisheries, Colombo, Ceylon, July 1955. Includes the following articles: "An Investigation into the Keeping Qualities of Ungutted Fish from the Trawlers," by A. W. Lantz and L. D. Gunasekera; "Preservation of Fish," by A. W. Lantz and C. Gunasekera; "Fishery By-products--Liquid Fish Meal," by A. W. Lantz and C. Gunasekera; "Study of Wadge Bank Trawl Fishery," by S. Sivalingam and J. C. Medcof; "Ceylon Moss--A Marine Source," by M. Durairatnam

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and J. C. Medcof; and "Ceylon's Beach Seine Fishery," by P. Canagaratnam and J. C. Medcof.

Commercial Utilization of Dolphins (Porpoises) in Ceylon, by A. W. Lantz and C. Gunasekera, Bulletin No. 3, 14 pp., illus., printed. Department of Fisheries, Colombo, Ceylon.

(Delaware) Annual Report of the Delaware Commission of Shell Fisheries of the State of Delaware for the Fiscal Year July 1, 1954 to June 30, 1955, 7 pp., processed. The Delaware Commission of Shell Fisheries, Dover, Del., 1955. Short description of oyster industry.

Die DLG-Leistungsprufung fur Fischwaren, 1954 (The DLG Performance Test for Fishery Products, 1954), by W. Ludorff, article, Dtsch. Lebensmitt.-Rdsch., vol. 51, 1955, pp. 154-158, printed.

Directory of Public Refrigerated Warehouses, 1956, 148 pp., illus., printed. National Association of Refrigerated Warehouses, Tower Bldg., Washington 5, D. C. Contains complete up-to-date listings of the organization, services, and facilities of all NARW member companies (specializing in the safe storage of perishable commodities requiring freezer or cooler service) operating throughout the United States, its possessions, and various foreign countries.

East African Marine Fisheries Research Organization Annual Report, 1954-1955, 92 pp., illus., printed. Government Printer, Nairobi, Kenya, 1955. This report covers all of 1954 and from January 1-June 30, 1955. It describes the Organization's scientific investigations of the economically-valuable fishes of East African waters and fishing methods.

"Exploring Davy Jones's Locker with Calypso," by Capt. Jacques-Yves Cousteau, article, The National Geographic Magazine, vol. CIX, no. 2, February 1956, pp. 149-161, illus., printed, single copy 75 cents. National Geographic Society, Washington 6, D. C. Describes an expedition of the ocean research vessel, Calypso, in which tests were made with a new camera designed by Dr. Harold E. Edgerton to take the world's first photographs under the Indian Ocean and Red Sea.

"Fisheries and Naval Architecture," by Jan-Olof Traung, article, FAO Fisheries Bulletin, vol. VIII, no. 4, October-December 1955, pp. 167-197, illus., printed. Food and Agriculture Organization of the United Nations, Rome, Italy. A discussion of fisheries and naval architecture with chapters on (1) models; (2) the fisheries naval architect; (3) naval architects need to go fishing; (4) approach to the work; (5) boats will always be improved; (6) the dilemma of speed; (7) hull shape; (8) importance of sharp entrance; (9) block co-efficient; (10) prismatic co-efficient; (11) shape of the aft body; (12) importance of sharp propeller posts; (13) scope for improvement; (14) sea-kindliness; (15) propellers; (16) selection of engines; (17) hull construction; (18) work to be done; and (19) increased recognition of naval architecture in fisheries.

Fishes of Japan, by Yaichiro Okada, 462 pp., illus., printed, $10. Maruzen Co., Ltd., Tokyo, Japan, 1955. Describes and illustrates 391 species of fish which inhabit the waters in and around Japan. Gives information on the distribution, ecology, life history, method of capture, and utilization of the various species. Also includes a list of the scientific, Japanese, and English names of the fish.

"Fish Meals as Amino Acid Sources in Chick Rations," by C. R. Grau and M. A. Williams, article, Poultry Science, vol. 34, 1955, pp. 810-817, printed. Poultry Science, Kansas State College, Manhattan, Kansas.

"Fishing Vessels and the Principle of Innocent Passage," by Charles B. Selak, Jr., article American Journal of International Law, vol. 48, no. 4, October 1954, pp. 627-635, printed, single copy $2. The American Journal of International Law, 1826 Jefferson Pl. NW., Washington 6, D. C.

Fourteenth Annual Report of the Atlantic States Marine Fisheries Commission (to the Congress of the United States and to the Governors and Legislators of the Fifteen Compacting States), 62 pp., printed. Atlantic States Marine Fisheries Commission, 22 West First St., Mount Vernon, N. Y., April 1956. In this annual report the Commission reports progress on fishery research projects initiated and carried on by the Commission and on its behalf by the U. S. Fish and Wildlife Service. Under the North Atlantic Section of the report are included discussions of projects dealing with lobsters, haddock, clams, freezing fish in the round at sea, rebuilding the Service's Woods Hole Laboratory, ocean perch, cooperative striped bass program, shad, yellowtail flounder, exploratory fishing, catch statistics, fishery college in Massachusetts, Atlantic salmon, sea scallops, dams in the Connecticut River, dragging operations, industrial fishing (formerly called "trash" fishing), whiting, Maine herring, fluke, technological program under Saltonstall-Kennedy Act, and the need for improving technological facilities. Under the Middle Atlantic Section there is a discussion of projects dealing with shad, Delaware River anadromous fisheries management program, gray sea trout (weakfish), cooperative striped bass program, catch statistics, fluke, offshore ocean fisheries and waste disposal problems, sea scallops, dragging operations, sportfish surveys, yellowtail flounder, hard clams, menhaden studies, and Saltonstall-Kennedy funds for state research. The Chesapeake Bay Section includes discussions of projects concerned with croaker, blue crab, Chesapeake Bay Institute, shad, cooperative striped bass program, oysters, joint legislative committee on migratory finfish, menhaden, clams, deposits of mine waters in Chesapeake Bay, catch statistics, and finfish research. Under the South Atlantic Section a discussion of the following programs is included: cooperative offshore research program, shrimp, shad, license fees and severance taxes, catch statistics, cooperative striped bass program, bluefin tuna, gear development, out-of-state boats in inland waters, sale of fish by anglers, pollution, blue crabs, marketing survey of Florida fisheries, southern oyster technological

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research, and recommendations of the International Law Commission. Another section of the report deals with the following general subjects: catch statistics; Northwest Atlantic fisheries; Amendments No. 1 and No. 2 to the Atlantic States Marine Fisheries Compact--Common Fisheries and Inland Fisheries; fisheries research; legislation needed; activity of the fishing industry; the growing giant--sportfishing; vessel insurance survey; cooperative striped bass program; Federal water pollution control legislation; fisheries education; Northern Regional Committee on Marine Science; and report of International Law Commission re territorial waters and offshore fisheries.

(Gold Coast) Report of the Fisheries Department for the Year 1954-55, by F. R. Johnson, 10 pp., illus., printed, 2s. (28 U. S. cents). Government Printing Department, Accra, Gold Coast, 1956. This report, which covers the period from April 1954 through March 1955, describes the activities of the Fisheries Department as follows: (1) continued experiments in the use of motor surfboats as fishing vessels and the training of crews; (2) trawl catch; (3) construction of a fishing harbor at the port of Tema; (4) canoe fisheries; (5) building of motor fishing vessels in the Department's yard at Sekondi; and (6) development of the river fisheries.

Growth Studies in the Quahog, VENUS MERCENARIA, by Alton H. Gustafson, 11 pp., illus., processed. (Reprinted from Proceedings of the National Shellfish Association, vol. 45, pp. 140-150, 1954.) Department of Sea and Shore Fisheries, Vickery-Hill Bldg., Augusta, Maine. A preliminary and progress report of the growth studies of the quahog, Venus mercenaria. It deals chiefly with a comparison of growth of populations of several sizes planted under differing conditions in several localities, an analysis of the annual increment, and some comparisons with conditions reported in other geographic areas.

The Herring Gull-Cormorant Control Program, State of Maine, 1953, by Robert L. Dow, General Bulletin No. 1, 26 pp., printed. Department of Sea and Shore Fisheries, Augusta, Maine, revised Aug. 1953.

"The Historical Origins of the Three-Mile Limit," by H. S. K. Kent, article, American Journal of International Law, vol. 48, no. 4, October 1954, pp. 537-553, printed, single copy $2. The American Journal of International Law, 1826 Jefferson Pl. NW., Washington 6, D. C.

(International Commission for the Northwest Atlantic Fisheries) Statistical Bulletin for the Year 1954, vol. 4, 59 pp., illus., printed. International Commission for the Northwest Atlantic Fisheries, Halifax, N. S., Canada, 1956. This bulletin is divided into two parts as follows: Part I summarizes the 1954 statistics, and Part 2 gives tables of statistics dealing with the fisheries in the Convention Area in 1954. The material is the outcome of the combined work of the fisheries departments of the eleven countries fishing in the Northwest Atlantic, and comprises a wealth of detailed information on fishing efforts and landings. In previous years the statistics recorded in the Bulletin referred only to groundfish. However, at the Fifth Annual Meeting the Commission decided that statistics should be collected on all species landed in order to get as complete a picture as possible of the total utilization of the marine resources. Accordingly, the present Bulletin includes summary statistics on all marine species landed from the Convention Area. They are listed with their scientific names and the common names used in the member countries.

Investigations of Indiana Lakes and Streams, vol. IV, October 1955, 228 pp., illus., printed. Department of Zoology, Indiana University, Bloomington, Ind. Includes the following reports: "A Study of the Factors Affecting Stream Productivity by the Comparative Method," by Keith Vollmer Slack; "Key to the Fishes of Indiana," by Shelby D. Gerking; "Reproduction of the White Bass, Morone chrysops," by Carl D. Riggs; "The Injection of Latex Solution as a Fish Marking Technique," by Claude S. Davis; "Fish and Fishing in Spear Lake, Indiana," by W. E. Ricker; "Oxygen Depletion in Salt Creek, Indiana," by Myrtle V. Schneller; and "Distributional Ecology of the Cisco (Coregonus artedii) in Indiana," by David G. Frey.

(Italy) Statistica della Pesca e della Caccia, 1955 (Fishing and Hunting Statistics, 1955), 90 pp., illus., printed in Italian. Istituto Centrale di Statistica, Rome, Italy, 1955.

Laxfisket och Laxbestandet I Ostersjoomradet Under Senare Ar (The Salmon Catch and the Salmon Stock in the Baltic during Recent Years), by F. Byrachefen and Dr. Gunnar Alm, 63 pp., illus., printed in Swedish with summary in English. (Reprinted from Svenska Vattenkraftforeningens Publikationer 441 (1954:5) pp. 43-100) Svenska Vattenkraftforeningens Publikationer Erhallas Genom Foreningens Expedition, Norrlandsgatan 16, Stockholm, Sweden.

The Marine and Fresh-Water Plankton, by Charles C. Davis, 562 pp., illus., printed, $10. Michigan State University Press, East Lansing, Mich.

(New Zealand) The Fisheries (General) Regulations 1950 (Reprint), 1956/16, 33 pp., printed, 1s. 6d. (20 U. S. cents). Marine Department, Wellington, New Zealand, 1956. These regulations are divided into parts, as follows: Part I--Preliminary; Part II--Nets and Net Fishing; Part III--Danish Seining and Similar Methods; Part IV--Trawling; Part V--Line Fishing; Part VI-- Blue Cod; Part VII--Swordfishing; Part VIII--Crayfish; Part IX--Shellfish; Part IXa--Flatfish; Part X--Miscellaneous and General.

(North Dakota) Fishing Regulations Governing the Taking of Fish in North Dakota during the Calendar Year 1956, 2 pp., printed. North Dakota Game & Fish Dept., Bismarck, N. Dak. Commercial fishing regulations are included as well as sport fishing regulations.

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Organization for Trade Cooperation, Department of State Publication 6268, Commercial Policy Series 155, 25 pp., illus., printed, 15¢. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Department of State, Washington, D. C., 1956. This pamphlet is designed to give a simple explanation of the OTC--its aims, structure, and responsibilities.

(Pacific Marine Fisheries Commission) Eighth Annual Report of the Pacific Marine Fisheries Commission for the Year 1955 (To the Congress of the United States and to the Governors and Legislatures of Washington, Oregon and California), 16 pp., printed. Pacific Marine Fisheries Commission, Portland, Ore. Describes briefly the activities of the Commission and contains a short resume of the one meeting of the Commission during 1955. Also included are summaries of reports submitted by the participating agencies on the research conducted in 1955 on the following marine species and fisheries: petrale sole fishery, troll chinook salmon fishery, sablefish (black cod) fishery, ocean salmon, albacore tuna, and otter trawl fishery. In addition, contains a financial report of the Commission.

Papers Presented at the International Technical Conference on the Conservation of the Living Resources of the Sea, Rome, 18 April to 10 May 1955, A/CONF. 10/7, United Nations Publication Sales No.: 1956.II.B.1, 383 pp., illus., processed, $3. International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y., 1956. The International Technical Conference on the Conservation of the Living Resources of the Sea which was held in 1955 marked the second occasion on which a United Nations conference discussed the conservation of fish and other marine resources. Following an introductory paper on the historical development of concepts of conservation, the papers in this volume, which were presented at the Conference, are grouped into the following general categories: broad scientific and theoretical aspects of conservation; operations under existing international conventions; and specific regional resources or problems. Finally, there are two papers dealing in more general terms with the identification of conservation problems and suggestions for their solution. The papers are listed as follows: "Concepts of Conservation," by Michael Graham; "The Scientific Basis for a Conservation Programme," by Milner B. Schaefer; "A First Approximation to a Modern Theory of Fishing," by Michael Graham; "Aspects of the Life History of Certain Resources of the Sea in Relation to the Physical Environment," by United Nations Educational, Scientific and Cultural Organization; "The Conservation of Biological Resources in Coastal Waters," by Gerard Belloc; "Biological Appraisal of the Ocean, and the Problem of Transoceanic Acclimatization," by Lev Zenkevich; "International Conservation Problems, and Solutions in Existing Conventions," by William C. Herrington and John L. Kask; "Regulation of North sea Fisheries under the Convention of 1946," by Cyril E. Lucas; "Conservation Problems in the North-Western Atlantic," by Erik M. Poulsen; "Scientific Investigation of the Tropical Tuna Resources of the Eastern Pacific," by Milner B. Schaefer; "Management of the Halibut Fishery of the North-Eastern Pacific Ocean and Bering Sea," by Henry A. Dunlop; "The International Fraser River Sockeye Salmon Fishery," by Loyd A. Royal; "The International Whaling Commission," by Remington Kellogg; "Note on the General Fisheries Council for the Mediterranean," by M. J. Girard; "Fluctuations in the Commercial Fish Populations of the North-Western Pacific in Relation to Environmental and Other Factors," by Petr Moiseev; "Fishery Problems and Fishery Conservation in Italy," presented by the Italian delegation; "Life History, Ecology and Behaviour of Important Species Constituting the Fishery Resources of the Seas Around Japan," presented by the Japanese Delegation, with comments by the Korean and Japanese delegations; "The Importance of Conservation of Stocks of Fish and Sea Mammals in Arctic Waters," by Paul Hansen; "Productivity and Intensity of Exploitation of the Adriatic," by Sime Zupanovic; "Migrations of the Adriatic Sardine in Relation to Zooplankton," by Tomo Gamulin; "Some Observations on the Marine Fisheries of Egypt," by Mohamed Zuhdi; "Comments on the Principle of Abstention," by William C. Herrington; and "Classification of International Conservation Problems," by Geoffrey L. Kesteven and Sidney J. Holt.

Participation of the United States Government in International Conferences, July 1, 1953-June 30, 1954, Department of State Publication 5776, International Organization and Conference Series I, 28, 245 pp., printed, 70¢. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Office of International Conferences, Department of State, Washington, D. C., 1955. This volume is designed to serve as a record of the official participation of the United States Government in multilateral international conferences and meetings of international organizations during the period July 1, 1953-June 30, 1954. The meetings on fisheries are listed as follows: (1) First Meeting of the International North Pacific Fisheries Commission, Washington, D. C., February 1-12, 1954; and (2) Fourth Meeting of the International Commission for the Northwest Atlantic Fisheries, Halifax, June 14-19, 1954.

(Portugal) Estatistica das Pescas Maritimas no Continente e Ilhas Adjacentes no Ano de 1950 (Marine Fisheries Statistics for the Continent and the Adjacent Islands in 1950), 127 pp., printed. Ministerio da Marinha, Comissao Central de Pescarias, Lisbon, Portugal, 1955.

Principles of Plant Layout for Small Plants, by Raymond C. Newton, Technical Aids for Small Manufacturers No. 42, 4 pp., processed. Small Business Administration, Washington 25, D. C., April 1956.

Progress Reports of the Pacific Coast Stations, No. 105, 30 pp., illus., printed. Fisheries Research Board of Canada, Ottawa Canada,

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February 1956. Among the articles included are: "Growth of the British Columbia Shipworm," by D. B. Quayle; "Control of Post-Mortem Bacterial Spoilage of Whales with Chlortetracycline," by P. B. Crean, H. L. A. Tarr and R. B. Barker; "The Relation of Stock Density to 'Milkiness' of Lemon Sole in Union Bay, B. C.," by C. R. Forrester; "Effect of Chlortetracycline and Storage Temperatures on the Quality of Shucked Oysters," by J. W. Boyd and H. L. A. Tarr; "Seasonal Temperature and Salinity Variations in Queen Charlotte Strait, B. C.," by F. G. Barber; "Project NorPac," by A. J. Dodimead; "The Sodium and Potassium Content of British Columbia Sea Foods. II. Some Commercially Important Fresh Fish," by J. McBride and R. A. MacLeod; "Age and Growth of Lingcod (Ophiodon elongatus)," by B. M. Chatwin; "The Conversion of Herring Stickwater to Solubles. III. Preservative Action of Penicillin G on Salmon Offal Stickwater Under Plant Conditions," by W. A. B. Thomson, R. E. E. Jonas, R. A. MacLeod and D. R. Idler.

Protokolle zur Fischereitechnik (Journal of Fishery Technology), Heft 15, Bd. III (vol. 3, no. 15), 66 pp., illus., processed, in German. Institut fur Netz- und Materialforschung, Hamburg 36, Neuer Wall 72, Germany, October 1955. Contains two articles: one on experiments with new gear in the river fishery of the Lower Weser, and another on new fibres for use by the fishing industry.

Report to Congress on the Mutual Security Program (For the Six Months Ended December 31, 1955), 37 pp., illus., printed, 35 cents. Mutual Security Agency, Washington, D. C., December 31, 1955. (For sale by Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

Research Briefs, vol. 6, no. 1, November 1955, 38 pp., illus., printed. Fish Commission of Oregon, 307 State Office Bldg., Portland 1, Oregon. Includes the following articles: (1) "The Intertidal Mussel, Piddock, and Abalone Resources of Oregon's Outer Coast," by James E. McCauley and Lowell D. Marriage; (2) "The Transfer of Hatchery Fish to Estuarine Waters," by John T. Gharrett; (3) "Escapement of Spring Chinook Salmon and Steelhead Over Willamette Falls in 1953," by Earl F. Pulford; (4) "Fourth Progress Report on Salmon Diet Experiments," by James W. Wood, Wallace F. Hublou, Thomas B. McKee, Russell O. Sinnhuber, and Duncan K. Law; and (5) "Migrations of Starry Flounder (Platichthys stellatus) Tagged in the Columbia River," by Sigurd J. Westrheim.

"Role of Science in Marine Fisheries: Limitations and Potentialities," by R. E. Coker, article, The Scientific Monthly, vol. 82, no. 4, April 1956, pp. 176-193, illus., printed, single copy 75¢. The Scientific Monthly, 1515 Massachusetts Ave. NW., Washington 5, D. C. An excellent discussion of the role of science in marine fisheries. The author discusses briefly some prominent contrasts between the conditions that face agricultural and fishery scientists. To marine biologists, some of the conditions may well seem too obvious to require discussion. Nevertheless, the conditions are not always fully grasped by those who would support scientific research in aid of fisheries, and their statement in brief is requisite background for consideration of potentialities and limitations. The author discusses in greater detail scientific research and problems in the individual estuarine fisheries and the sea fisheries. In conclusion he states that "it may not be quick and spectacular increases in fishery yield that can be expected but rather gradual and substantial improvement, based on scientific and economic studies to support and supplement individual initiative and enterprise, which must always be a chief reliance. Increasing profit to fishermen and to states and wiser regulation of fishery practices with fewer useless and costly restrictions are to be striven for. It is a virtual certainty that gratifying results will follow from continued and energetic cooperation between administrators, scientists, statisticians, economists, and, most important, fishery operators and fishermen."

"Some Thermodynamic Properties of Fish and their Effect on the Rate of Freezing," by R. A. K. Long, article, J. Sci. Food Agric., vol. 6, 1955, pp. 621-633, printed.

The Sea and Its Rivers, by Alida Malkus, 221 pp., illus., printed, $2.75. Doubleday & Co., 575 Madison Ave., New York 22, N. Y. Stories about the Gulf Stream and other currents, the ocean's waves and tides, the varied life, and the mineral wealth in the sea.

"Studies on the Conversion of Fish Stickwater to Solubles. I. The Bacterial Decomposition of Stickwater at High Temperatures," by R. A. Mac Leod, D. R. Idler, and W. A. B. Thomson, article, Applied Microbiology, vol. 3, 1955, pp. 202-204, printed. Williams and Wilkins Co., Mt. Royal and Guilford Avenues, Baltimore 2, Md.

"Studies on the Conversion of Fish Stickwater to Solubles. II. Prevention of Bacterial Decomposition of Stickwater at High Temperatures," by D. R. Idler, R. A. MacLeod, W. A. B. Thomson, article, Applied Microbiology, vol. 3, 1955, pp. 205-208, printed. Williams and Wilkins Co., Mt. Royal and Guilford Avenues, Baltimore 2, Md.

(Sweden) Fiske, 1954 (Fisheries, 1954), 78 pp., illus., printed in Swedish with summary in English. Central Bureau of Statistics, Stockholm, Sweden, 1956. An account of the fisheries of Sweden during 1954, with special reference to the salt-water fisheries. Statistics are given for the number of fishermen, fishing gear, and fishing craft in the salt-water fishery, by counties; quantity and value of the salt-water fishery in different fishing areas and by counties; herring fishery (including Baltic herring) by certain counties; and other statistical data. Also includes a list of the different kinds of fish and shellfish in Swedish, Latin, and English.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATIONS ISSUING THEM.

39 Fathoms Southeast, North Edisto Sea-Buoy off South Carolina, by Francis B. Taylor, Contributions from Bears Bluff Laboratories No. 20, 15 pp., illus., printed. Bears Bluff Laboratories, Wadmalaw Islands, S. C., April 1956. A report covering the activities of the Laboratories' offshore research vessel, T-19, from April 1955 through February 1956. The program includes a study of (1) the ocean habitat of the brown shrimp, Peneaus aztecus, the brown-spotted shrimp, Peneaus duorarum, and the white shrimp, Peneaus setiferus; (2) evidences of their migratory movements, spawning habits, and catchability at sea; (3) pelagic movements of the crab family, especially the blue crab, Callinectes sapidus, the only species in South Carolina of any commercial use; (4) bottom characteristics and water temperatures at various depths; and (5) the composition of the aquatic population. While the accent is on the practical aspects of deep-sea fishing, due attention is given to the ecological and taxonomic requirements of the program.

Tunas of the Genus THUNNUS of the Northern Caribbean, by Harvey R. Bullis, Jr., and F. J. Mather, III, American Museum Novitates Number 1765, 12 pp., illus., printed. The American Museum of Natural History, Central Park West at 79th St., New York 24, N. Y., April 6, 1956. A report of the Service's exploratory fishing expedition in the northern Caribbean. Observations show that all five species of the genus Thunnus (bluefin tuna, T. Thynnus; albacore, T. alalunga; blackfin tuna, T. atlanticus; Atlantic big-eyed tuna, T. obesus; and yellowfin tuna, T. albacares) known to occur in the Atlantic may be found in the Caribbean. The authors state that "Three of these, the yellowfin, the albacore, and the Atlantic big-eyed, were encountered in sizes which may be fished efficiently by the long-line method and utilized in canneries. This may be a factor of some importance to the new tuna industry that is being started in Puerto Rico, as dependence on a single species might result in serious fluctuations in supply. A further implication that may be drawn from these observations is that the yellowfin tuna, the albacore, and the Atlantic big-eyed, which are known to be abundant in the eastern Atlantic as far west as the Azores, may be distributed all the way across the tropical and subtropical parts of that ocean. This suggests the possibility of an extensive tuna resource in the tropical Atlantic."

United States Exports of Domestic and Foreign Merchandise (Commodity by Country of Destination), Calendar Year 1955, Report No. Ft 410, Part II, 403 pp., processed, $1.75. Bureau of the Census, U. S. Department of Commerce, Washington, D. C., April 1956. (For sale by the Superintendent of Documents, Washington 25, D. C.)

The Use of Equipment and Techniques in Applied Shellfish Management, by Dana E. Wallace, 3 pp., processed. (Reprinted from Proceedings of the National Shellfish Association, vol. 45, pp. 209-211, 1954) Department of Sea and Shore Fisheries, Vickery-Hill Bldg., Augusta, Maine. Maine's hard and soft-shell clam fishery is dependent upon natural sets, their survival and growth to commercial size, and, in the soft-shell industry, the efficiency with which the clams are harvested. This article summarizes the projects of the Department of Sea and Shore Fisheries as well as cooperative work with the Fish and Wildlife Service Clam Investigations, and the application of results as carried on with shellfish producing communities.

The Whiting (GADUS MERLANGUS L.) in the North Sea, by R. W. Ellis and R. Jones, Scottish Home Department Marine Research No. 2, 28 pp., illus., printed, 5s. (70 U. S. cents). Her Majesty's Stationery Office, Edinburgh, Scotland, 1956. The whiting is distributed over most of the fishing grounds of the North Eastern Atlantic but of these the North Sea is much the most important in contributing more than 50 percent of the European landings. This report discusses the distribution of O and I group whiting, adult distribution, brood fluctuations, growth, and the relationship between yield and mortality rate. Adult whiting are found all over the North Sea although their center of density is no longer in the central regions but tends to be farther to the north. Whether this can be regarded as evidence of a northerly migration with age, or simply as the consequence of the much higher rate of fishing that takes place in the central area, it is not possible to say. A study of the commercial whiting statistics revealed that there had been an increase in post-war landings associated with a decrease in the total fishing effort. A theoretical relationship between fishing mortality rate and yield was derived for the whiting and it was concluded that the post-war increase in landings was such that it could reasonably have been due to the decrease in fishing effort that actually took place.

The Wonderful World of the Seashore, by Albro Gaul, 247 pp., illus., printed, $5. Appleton-Century-Crofts, Inc., 35 W. 32nd St., New York 1, N. Y.

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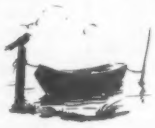

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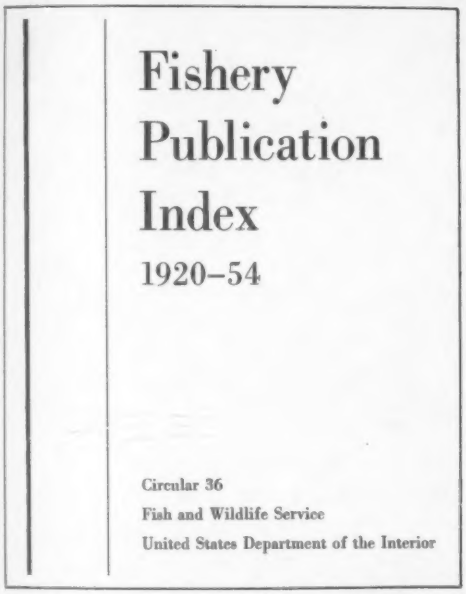
P. 25--R. W. Coad; p. 25--"Southern Fisherman;" p. 41--A. M. Sandberg; p. 54--G. T. Sundstrom; and p. 58--R. G. Schmidt.

PUBLICATION CATALOGUES UNITED STATES FISHERY PUBLICATIONS

If it pertains to commercial fishing--if it has been printed by the Government--if the subject matter falls anywhere between "abaca," which is a fiber, and Zuiho Maru," which is a research vessel--and if the author's name should happen to be in that part of a bibliography beginning with "Abernethy, R. F." and ending with "Zobairi, R. A. K."--then it will be listed in the Fishery Publications Index 1920-1954, recently published by the U. S. Fish and Wildlife Service as Circular 36.



This new publication supplements "An Analytical Subject Bibliography of Publication of the Bureau of Fisheries, 1871-1920." This completes the indexing of all Government fishery publications from the time the Federal Government took official interest in commercial fishing in 1871 to and including the year 1954.

The new Index is in three parts--the Publications Series, the Author Index, and the Subject Index. The Subject Index lists several thousand things and conditions studied or observed by fishery scientists and technicians over the 34-year period. The topics touch almost every conceivable phase of the fishery business, from the control of fungus on pike eggs to freezing fish, cooking shrimp, deep-sea trawling, and control of the sea lamprey. More than a thousand technical and scientific authors are listed with a cross-reference to their contributions to fishery research and services.

In the Publications Series will be found a listing of every article on fisheries printed by the Government since 1920, its title and a reference to the Series in which it appeared. The media listed in this section are: Administrative Reports, Circulars, Conservation Bulletins, Current Fishery Statistics, Documents, Economic Circulars, Fishery Bulletins, Fishery Circulars, Fishery Leaflets, Investigational Reports, Market Development Leaflets, Progressive Fish Culturist, Regulatory Announcements, Research Reports, Separates, Special Scientific Reports, Special Scientific Reports--Fisheries, Statistical Digests, and Test Kitchen Series.

Circular 36 is for sale by the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C., for $1.50 a copy.

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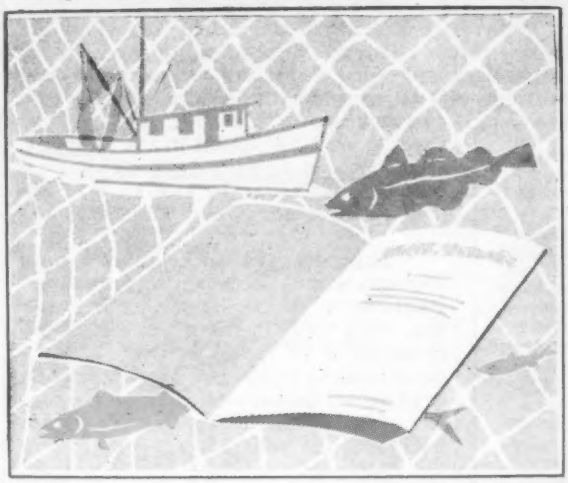
FISHERY STATISTICAL PUBLICATIONS

Fishery Leaflet 432, Fishery Statistical Publications of the Fish and Wildlife Service, has been published to acquaint persons interested in the fishing industry with the Statistical and Market News publications released by U. S. Fish and Wildlife Service. This leaflet shows the titles of the various reports, a brief description of the information contained in each publication, and the frequency with which it is released.



To operate efficiently, an industry must have readily available accurate current information concerning its operations. Data on production prices, sales, stocks, and related information provide a measure of whether an industry is in a healthy or an unhealthy condition. Review of an industry's statistics indicates trends which assist members in arranging their activities so as to take advantage of changing business conditions. Statistics supply government with the information it requires in peacetime to assist in protecting and developing industry, and in periods of national emergencies they are the foundation on which a government marshalls its strength.

The fishing industry and the governmental agencies concerned with the fisheries are particularly dependent upon statistical information for several reasons. The industry is widely scattered, extending over thousands of miles of coastline and in the waters of the interior. A large portion of the catch is taken by small independent fishermen, and much of it is sold through small dealers who have little contact with other segments of the fishing business. With over 200 species of fish and shellfish taken commercially and with the numerous manufactured products prepared from these various species, it is impossible for any person or agency to follow trends in the fisheries without adequate statistical data.

In order to supply these data, the Fish and Wildlife Service conducts statistical surveys of the fisheries, and assembles information collected by State fishery departments and other local, state, and Federal agencies. Information is obtained on employment in the fisheries, the volume and value of the catch, production of manufactured fishery products, freezings and cold-storage holdings, foreign trade statistics, and related information on a monthly and annual basis. Daily and weekly data relating to market conditions are also collected in the more important marketing or producing centers. The data collected in these various ways are published in a large number of statistical bulletins, Fishery Market News reports, and other publications. The most complete annual data are published in the Statistical Digests.

Copies of Fishery Leaflet 432 are available free from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.